Xantrex™ GT500 E 500 kW and Xantrex GT630 E 630 kW Grid-Tied Photovoltaic Inverters

Xantrex GT500 E
Xantrex GT500 E GI

Xantrex GT630 E
Xantrex GT630 E GI
Xantrex GT630 E GI 1K

Planning, Installation, Troubleshooting and Maintenance Manual

www.schneider-electric.com

Schneider Electric

Xantrex GT500 E 500 kW and Xantrex GT630 E 630 kW Grid-Tied Photovoltaic Inverters

Planning, Installation, Troubleshooting and Maintenance Manual

www.schneider-electric.com

Schneider Electric

Trademarks

Schneider Electric, the **Schneider Electric logo**, and **Xantrex** are trademarks or registered trademarks of the Schneider Electric group of companies. Other trademarks, registered trademarks, and product names are the property of their respective owners and are used herein for identification purposes only.

Notice of Copyright

Copyright © 2009, 2010 Xantrex Technology Inc. All rights reserved. No part of this document may be reproduced in any form or disclosed to third parties without the express written consent of:

Xantrex Technology Inc.
161-G South Vasco Road
Livermore, California USA 94551

Xantrex Technology Inc. reserves the right to revise this document and to periodically make changes to the content hereof without obligation or organization of such revisions or changes unless required to do so by prior arrangement.

Exclusion for Documentation

UNLESS SPECIFICALLY AGREED TO IN WRITING, XANTREX TECHNOLOGY INC. ("XANTREX")

(A) MAKES NO WARRANTY AS TO THE ACCURACY, SUFFICIENCY OR SUITABILITY OF ANY TECHNICAL OR OTHER INFORMATION PROVIDED IN ITS MANUALS OR OTHER DOCUMENTATION;

(B) ASSUMES NO RESPONSIBILITY OR LIABILITY FOR LOSSES, DAMAGES, COSTS OR EXPENSES, WHETHER SPECIAL, DIRECT, INDIRECT, CONSEQUENTIAL OR INCIDENTAL, WHICH MIGHT ARISE OUT OF THE USE OF SUCH INFORMATION. THE USE OF ANY SUCH INFORMATION WILL BE ENTIRELY AT THE USER'S RISK; AND

(C) REMINDS YOU THAT IF THIS MANUAL IS IN ANY LANGUAGE OTHER THAN ENGLISH, ALTHOUGH STEPS HAVE BEEN TAKEN TO MAINTAIN THE ACCURACY OF THE TRANSLATION, THE ACCURACY CANNOT BE GUARANTEED. APPROVED XANTREX CONTENT IS CONTAINED WITHIN THE ENGLISH LANGUAGE VERSION WHICH IS POSTED AT WWW.SCHNEIDER-ELECTRIC.COM.

Date and Revision

August 2010 Revision B

Part Number

975-0581-01-01

Contact Information

www.schneider-electric.com

	☎	🖷	✉
North America	1 408 987 6255	1 925 245 1022	re.techsupport@schneider-electric.com
France	0 825 012 999		fr-re-techsupport@fr.schneider-electric.com
Deutschland	+49 (0) 180 575 6575	+49 (0) 2102 404 7101	solarservice@de.schneider-electric.com
España	+34 93 498 7466	+34 93 305 5026	re.techsupport@es.schneider-electric.com
L'Italia	+39 035 4151111	+39 035415 3200	IT-pronto-contatto@it.schneider-electric.com

For other country details please contact your local Schneider Electric Sales Representative or visit our website at:
http://www.schneider-electric.com/sites/corporate/en/support/operations/local-operations/local-operations.page

About This Manual

Purpose

The purpose of this Planning, Installation, Troubleshooting and Maintenance Manual is to provide explanations and procedures for planning and installing the Schneider Electric Xantrex GT500 E 500 kW and Schneider Electric Xantrex GT630 E 630 kW Grid-Tied Photovoltaic Inverters.

Scope

The Manual provides safety guidelines, detailed planning and setup information, and procedures for installing the inverter.

Audience

The Manual is intended for use by anyone who plans to construct or install a system involving the Xantrex GT500 E 500 kW and Xantrex GT630 E 630 kW Grid-Tied Photovoltaic Inverters. The information in this manual is intended for qualified personnel. Qualified personnel have training, knowledge, and experience in:

- installing electrical equipment and PV power systems (up to 1000 V),
- applying all applicable installation codes,
- analyzing and reducing the hazards involved in performing electrical work, and,
- selecting and using Personal Protective Equipment (PPE).

Organization

This Manual is organized into six chapters and one appendix:

Chapter 1, “Introduction” provides information about the features and functions of the Xantrex inverter.

Chapter 2, “Planning” provides information to help plan the installation of the Xantrex inverter.

Chapter 3, “Installation” describes the procedures needed to install the Xantrex inverter. This section includes unpacking and moving instructions, mounting instructions, and cabling instructions.

Chapter 4, “Verification” provides a checklist to ensure the installation of the Xantrex inverter is correct and complete.

Chapter 5, “Advanced Troubleshooting” contains information and procedures for qualified personnel to troubleshoot the Xantrex inverter.

Chapter 6, “Preventative Maintenance” contains information and procedures for qualified personnel to performing preventative maintenance on the Xantrex inverter.

Appendix A provides the environmental and electrical specifications for the Xantrex inverter.

Conventions Used

The following conventions are used in this guide.

WARNING

Warnings identify conditions or practices that could result in personal injury or loss of life.

CAUTION

Cautions identify conditions or practices that could result in damage to the unit or other equipment.

Important: These notes describe things which are important for you to know, but not as serious as a caution or warning.

Product Names

This manual includes information for two products: Xantrex GT500 E and Xantrex GT630 E.
Both inverters can have Grid Interactive Options (VAR control and low voltage ride-through). The Xantrex GT630 E GI can have the additional option of 1000 Vdc input voltage. Unless explicitly stated otherwise, the term Xantrex inverter will be used to describe inverters both with and without any of the options.

Abbreviations and Acronyms

ANSI	American National Standards Institute
CCU2	Converter Control Unit 2
GUI	Graphical User Interface
IEEE	Institute of Electrical and Electronics Engineers
IGBT	Insulated Gate Bipolar Transistor
IPM	Intelligent Power Module
NFPA	National Fire Protection Association
PV	Photovoltaic
UFCU	Universal Frontpanel Control Unit

Related Information

You can find more information about Schneider Electric as well as its products and services at www.schneider-electric.com.

Important Safety Instructions

READ AND SAVE THESE INSTRUCTIONS - DO NOT DISCARD

This manual contains important safety instructions for the Xantrex GT500 E 500 kW and Xantrex GT630 E 630 kW Grid-Tied Photovoltaic Inverters — Xantrex inverter — that must be followed during installation and maintenance procedures.

WARNING: Risk of electric shock, explosion, and arc flash

Before installing the Xantrex inverter read all instructions, cautionary markings, and all other appropriate sections of this manual. Exercise extreme caution at all times to prevent accidents.
Failure to follow these instructions will result in death or serious injury.

WARNING: Risk of electric shock, explosion, and arc flash. Risk of equipment damage

Unsafe conditions and damage to the inverter may result if the instructions, and electrical, physical, and environmental installation specifications in this manual are not obeyed.

WARNING: Risk of electric shock, explosion, and arc flash

The Xantrex inverter enclosures contain exposed conductors and parts operating at lethal voltage and at high enough energy to create an arc flash. Electrocution or severe burns may result. The enclosure doors should remain closed with the latches tightened, except during installation, maintenance or testing. These instructions are for use by qualified personnel. To reduce the risk of electric shock or arc flash, do not open any doors or remove any covers unless you are qualified to do so, are properly equipped with appropriate personal protective equipment, and have locked out and tagged out all sources of energy and verified that the inverter is de-energized. Do not open the cabinet doors if moisture is present (rain or heavy dew).

WARNING: Multiple sources with risk of electric shock, explosion, and arc flash

The Xantrex inverter is energized from the PV array, from the AC grid, and from an auxiliary AC source (backed up with a Xantrex UPS for Xantrex GT500 E & Xantrex GT630 E units with low-voltage ride-through capability). All 3 sources (4 including a Xantrex UPS) must be disconnected, locked-out and tagged-out, and all circuits tested to verify that the inverter is fully de-energized, according to the procedure on page viii, before servicing or maintenance. Opening the AC and DC disconnect switches on the inverter does not remove all power from the inverter. Wait 20 minutes for the DC bus capacitors, located within the cabinet, to discharge after removing power.

WARNING: Limitations on use

The Xantrex inverter is not intended for use in connection with life support systems or other medical equipment or devices. The Xantrex inverter may only be used in grid-interconnected PV systems; it is not suitable for any other application areas.

WARNING: Explosion hazard

The IGBT module may explode in the event of a major malfunction.
Do not operate the inverter with the doors open.

WARNING: Crush hazard

The inverters have a very high balance point and can easily fall over if they are moved without caution. The inverter must be securely attached to the mounting surface after positioning.

WARNING: Burn hazard

Inverters contain internal components that become hot during normal operation. Use caution when servicing if inverter has been operating. Allow time for parts to cool before contact.

WARNING: Risk of electric shock, explosion, and arc flash

When installing the Xantrex inverter use only components recommended or sold by Schneider Electric. Doing otherwise may result in a risk of fire, electric shock, injury to persons, and will void the warranty.

WARNING: Risk of electric shock, explosion, and arc flash

Do not attempt to operate the Xantrex inverter if it has been dropped, or received more than cosmetic damage during transport or shipping. If the Xantrex inverter is damaged, or suspected to be damaged, see the Warranty for this unit in the Xantrex GT500 E & Xantrex GT630 E Operation Manual.

WARNING: Risk of fire and equipment damage

The overcurrent protective devices within the Xantrex inverter are intended for protecting the Xantrex inverter circuitry only. It is the installer's responsibility to determine the overcurrent protection required for the PV array or external AC or DC cabling, in accordance with the applicable installation codes.

WARNING: Risk of electric shock, explosion, and arc flash. Risk of equipment damage

Unsafe conditions and damage to the inverter may result if the inverter is energized with condensation present inside the unit. Storage, transportation, and operational conditions must ensure that internal condensation is not created, or that the inverter is dry before energizing. Obey the environmental specifications and classifications in Table A-2 and Table A-3.

CAUTION: Risk of overheating

The inverters have supply air and exhaust air areas, which must remain unobstructed. The inverter can overheat and will cease operation if the installation, maintenance and clearance instructions are not adhered to. Ensure you remove the tracks required for transportation located at the top of the inverter.

CAUTION: Risk of equipment damage

Inverter electronics can be destroyed by static charge. Wear static protection gear, and use anti-static tools and procedures when servicing the inverter. Install external surge arrestors at the input of the UPS and ensure the CCU communication interfaces also have over voltage protection devices.

Personal Safety

Follow these instructions to ensure your safety while working with the Xantrex inverter.

Qualified Personnel

Only qualified personnel shall perform the installation, initial operation and maintenance of the Xantrex inverter. Follow all applicable workplace safety procedures and regulations regarding work practices, personal protective equipment (PPE), installation and test equipment, etc.

Service personnel must be equipped with personal protective equipment appropriate for the work to be performed, which may include some or all of the following:

- Electrically rated safety gloves
- Safety glasses
- Ear protection
- Electrical safety shoes/boots
- Electrical safety hard hat
- Padlocks and tags (for lock-out/tag-out of disconnects)
- Appropriately rated meter to verify that the circuits are de-energized (1000 Vac and DC rated, minimum)

Check local safety regulations for other requirements.

Operational Safety Procedures

Never work alone when servicing this equipment. A team of two is required until the equipment is properly de-energized, locked-out and tagged, and verified de-energized with a meter.

Thoroughly inspect the equipment prior to energizing. Verify that no tools or equipment have inadvertently been left inside the equipment.

Lock-out and Tag-out

Safety requirements mandate that this equipment not be serviced while energized. All power sources for the Xantrex inverter must be locked-out and tagged-out prior to servicing. A padlock and tag should be installed on the disconnect device for each energy source prior to servicing.

WARNING: Multiple sources with risk of electric shock, explosion, and arc flash

The Xantrex inverter is energized from the PV array, from the AC grid, and from an auxiliary AC source (backed up with a Xantrex UPS for Xantrex GT500 E & Xantrex GT630 E units with low-voltage ride-through capability). All 3 sources (4 including a Xantrex UPS) must be disconnected, locked-out and tagged-out, and all circuits tested to verify that the inverter is fully de-energized, according to the procedure on page viii, before servicing or maintenance. Opening the AC and DC disconnect switches on the inverter does not remove all power from the inverter. Wait 20 minutes for the DC bus capacitors, located within the cabinet, to discharge after removing power.

To ensure that the inverter is fully de-energized prior to servicing, and cannot be re-energized by other workers, a lock-out and tag-out procedure must be followed for each source supplying the inverter. Refer to Figure i and Figure ii for the locations of the external switches, internal guards, and internal disconnect switches referred to in the following procedure.

The PV circuit supplying the internal DC disconnect switch and the AC output circuit on the output of the internal AC disconnect switch remain live when the internal switches are opened. Those circuits are located behind guards in the DC interface enclosure and in the lower part of the AC interface enclosure. If the installation, service, or maintenance task to be performed requires removal of those guards, then external AC and DC disconnecting devices must also be opened, locked-out, and tagged-out. The following procedure contains steps that must be followed in all cases, and additional steps that only need to be followed if removing the guards.

Lock-out and tag-out steps required in all cases:

1. Ensure the inverter is not operating, by turning the ⏻/I (stand-by/power-on) switch (called ON/OFF on older models) to the ⏻ (stand-by) position, and by pushing in the emergency stop button. See Figure i.
2. Open, lock-out, and tag-out the AC disconnect switch (-Q1) inside the AC interface enclosure (+H0). See Figure ii for the location of the switch.
3. Open, lock-out, and tag-out the DC disconnect switch (-Q11) inside the DC interface enclosure (+H2). See Figure ii for the location of the switch.
4. Shut off the Xantrex UPS (for any Xantrex GT500 E & Xantrex GT630 E equipped with a UPS) by switching off the ON/OFF switch on the UPS and by switching off double pole breaker -F5 in the control enclosure (+H1). See Figure ii for the location of the breaker.
5. Open, lock-out, and tag-out the auxiliary AC input source at its external disconnect switch provided as part of the installation.

6. Remove fuses -F6 and -F7 from their fuseholders to further isolate the Auxiliary AC input power. See Figure ii for the location of the fuses.
7. Using a voltmeter with minimum ratings of 1000 Vdc and 600 Vac, tested on a known voltage source before use, verify that all incoming energy sources are de-energized by checking for zero voltage at all of the following locations as shown in Figure ii. In all cases, measure between the terminals listed, and from each of the terminals to ground. The voltage in all cases should be zero if all sources have been properly de-energized.
   a) AC output voltage: Measure between the terminals of fuseholder -F35 (terminals -F35:1, -F35:3, and -F35:5 in the +H0 enclosure) and from each terminal to ground.
   b) PV input voltage: Measure on the DC input bus bars physically located below the DC disconnect switch (-Q11) by inserting the meter probes through the slotted insulator to contact the bus bars (see DC bus- and DC bus+ in Figure ii). Measure the voltage between the busbars, and from each busbar to ground.
   c) Auxiliary AC input voltage: Measure the voltage between terminals -X2:L1 and -X2:L2, between -F6-1 and -F7-1, and from each of those terminals to ground.
   d) UPS voltage: For Xantrex GT500 E & Xantrex GT630 E equipped with a Xantrex UPS check the UPS output voltage at terminals -X2:24 and -X2:26, terminals -X4:1 and -X4:8, and from each of those terminals to ground.

The above procedure de-energizes and locks-out power from all sources except the PV input and AC output circuits located behind guards in the DC interface enclosure and in the lower part of the AC interface enclosure. If the installation, service, or maintenance task to be performed requires removal of those guards, you must perform the following additional steps.

To lock-out and tag-out sources behind the AC or DC guards:

8. Ensure you have followed steps 1-7 above.
9. Open, lock-out, and tag-out the AC output (grid) circuit at its external disconnect switch provided as part of the installation.
10. Open, lock-out, and tag-out all incoming PV input circuits at the external disconnect means provided as part of the installation.
11. Using a voltmeter with minimum ratings of 1000 Vdc and 600 Vac, tested on a known voltage source before use, verify that all incoming energy sources are de-energized by checking for zero voltage at all of the following locations as shown in Figure ii:
    a) AC output voltage: Check between the AC output field-wiring terminals L1, L2, L3 at the bottom of the AC interface enclosure, and from each terminal to ground.
    b) PV input voltage: Check at the PV input field wiring terminals PV+ and PV- at the bottom of the DC interface enclosure. Measure the voltage between PV+ and PV-, and from each terminal to ground.

Figure i External Lock-out and Tag-out Components

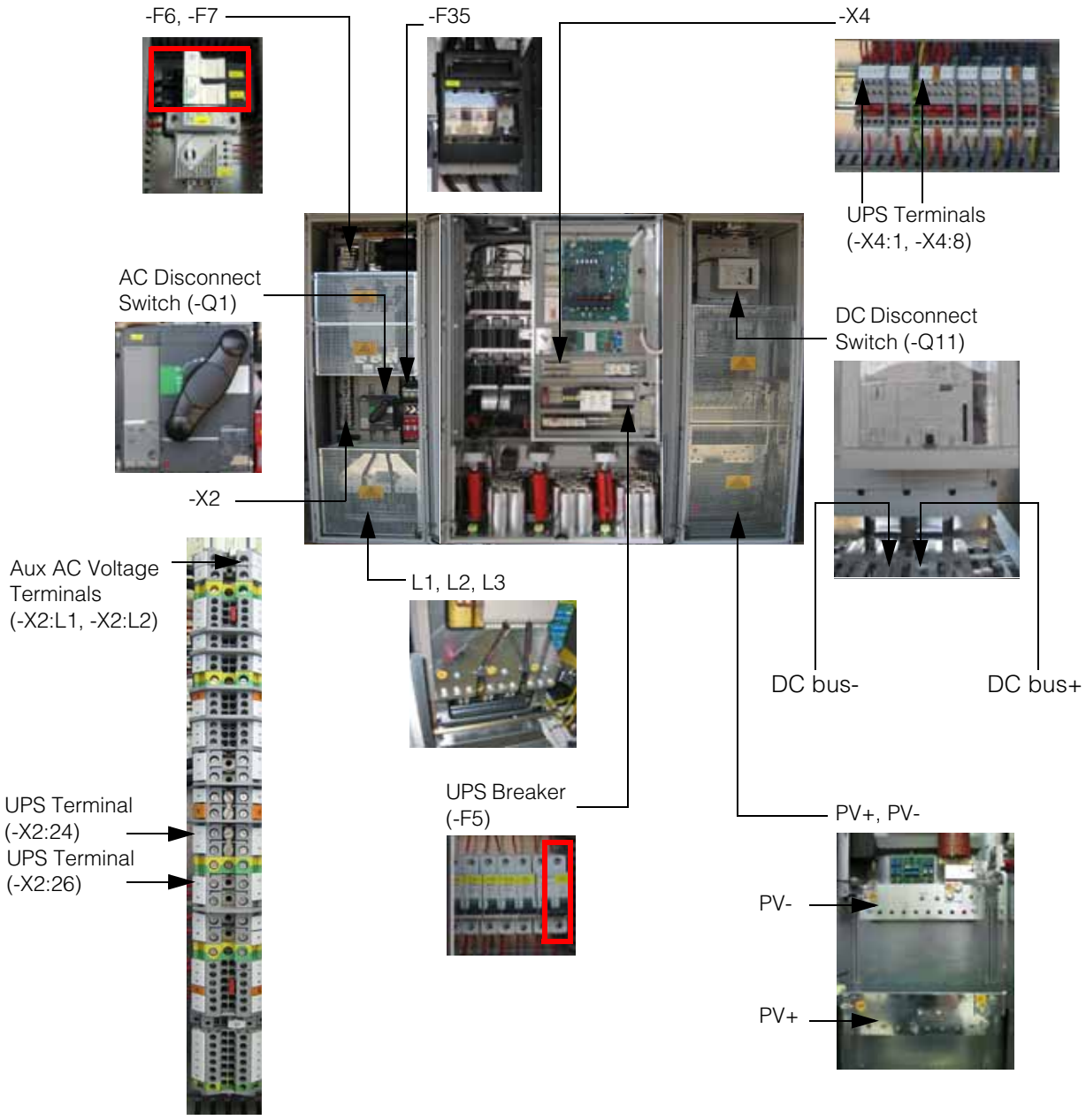

Figure ii Internal Lock-out and Tag-out Components

Contents

Important Safety Instructions - - -

4 Verification

Verification Procedure Summary ---- 4–2
Visual Inspection of Mechanical Connections ---- 4–3
Visual Inspection of Electrical Connections ---- 4–3
Corrective Action ---- 4–4
Energize Procedure (Startup) ---- 4–4

5 Advanced Troubleshooting

Faults and Fault Codes ---- 5–2
General Troubleshooting ---- 5–3
Automatically Clearing Faults ---- 5–3
Clearing Faults Manually ---- 5–3
Fault Code Descriptions ---- 5–4
Control Unit Disconnect Errors ---- 5–11

6 Preventative Maintenance

Maintenance Safety ---- 6–2
Maintenance Intervals ---- 6–3
Monthly Intervals or As Required ---- 6–3
Six Month Intervals ---- 6–3
5 year Interval ---- 6–4
10 year Interval ---- 6–4

A Specifications

System Specifications ---- A–2
Physical and Environmental Specifications ---- A–2
Regulatory Specifications ---- A–2
Electrical Specifications ---- A–3
Over Voltage, Under Voltage and Frequency Ranges ---- A–4
Bolt Sizes and Torque Requirements ---- A–5
Uninterrupted Power Supply – UPS ---- A–6
Dimensions ---- A–6

Figures

Figure i External Lock-out and Tag-out Components - - -

Tables

Table 5-1 Fault Codes - - -

1 Introduction

Chapter 1, “Introduction” provides information about the features and functions of the Xantrex inverter.

The Xantrex GT500 E 500 kW Grid-Tied Photovoltaic Inverter with optional Ride-through Capability and optional VAR Control is a utility interactive, three-phase power conversion system for grid-connected photovoltaic arrays with a power rating of 500 kW.

The Xantrex GT630 E 630 kW Grid-Tied Photovoltaic Inverter with optional Ride-through Capability, optional VAR Control and optional 1000 Vdc, which provides input range capability up to 1000 Vdc, is a utility interactive, three-phase power conversion system for grid-connected photovoltaic arrays with a power rating of 630 kW.

Description of the Xantrex inverter

Designed to be easy to install and operate, the Xantrex GT500 E 500 kW and Xantrex GT630 E 630 kW Grid-Tied Photovoltaic Inverters automate start-up, shutdown, and fault detection scenarios. With user-settable power tracking that matches the inverter to the array and adjustable delay periods, users are able to customize start up and shut down sequences. Multiple Xantrex GT500 E or Xantrex GT630 E inverters are easily paralleled for larger power installations.

The Xantrex inverter power conversion system consists of a pulse-width modulated (PWM) inverter, and switch gear for isolation and protection of the connected AC and DC power sources. Housed in a rugged IP20 rated, galvanized steel enclosure, the Xantrex inverter incorporates sophisticated Intellimod® (IPM) insulated gate bipolar transistors (IGBTs) as the main power switching devices. An advanced, field-proven, maximum peak power tracker (MPPT) integrated within the Xantrex inverter control firmware ensures the optimum power throughput for harvesting energy from the photovoltaic array.

Protection Features

The advanced design of the Xantrex inverter includes an EMI output filter and the main AC contactor located electrically on the inverter side of the isolation transformer. Additionally, the Xantrex inverter integrated controller contains self-protection features including over and under voltage and frequency safeguards. An integral anti-island protection scheme (Xantrex GT500 E & Xantrex GT630 E base units only) prevents the inverter from feeding power to the grid in the event of a utility outage.

User Interface

The Xantrex inverter includes a local user interface with a ⏻/I (stand-by/power-on) switch (called ON/OFF on older models), a keypad, and a 4-line, 80 character display. An available user-friendly Graphic User Interface (GUI) can provide an interface for the user to query Xantrex inverter system status, control, metering/ data logging and protective functions. These features can be accessed remotely using an optional communication kit.

Physical Characteristics

The Xantrex inverter comes in a set of three enclosures to house the Electronics described above. The left 1-door section is the AC interface enclosure (+H0). The center 2-door section is the main inverter enclosure (+H1). The right 1-door section is the DC interface enclosure (+H2). The three enclosures are constructed and delivered as one complete assembly. These components are identified in Figure 1-1 on page 1–3 and the dimensions are identified in Figure A-1 on page A–6.

Grid Interactive Options

The Xantrex GT500 E GI or Xantrex GT630 E GI has all of the features of the Xantrex GT500 E or Xantrex GT630 E base unit (respectively), with the addition of either VAR control or VAR control and low voltage ride through together. The low-voltage ride-through capability allows the inverter to continue operation during dips in the AC voltage and power-factor compensation, by using array, not line voltage to compensate for extra capacitance or inductance on the grid based on the user-settable parameters. To facilitate these features, the ride-through option does not provide anti-islanding protection. The VAR control provides reactive power control for full power across the power factor range.

1000 V Input Option

The Xantrex GT630 E GI 1K enables the Xantrex GT630 E to accept input voltages up to 1000 Vdc.

Operator Interface Controls

The Xantrex inverter comes in a set of 3 enclosures to house the electronics described above. The left 1-door section is the AC interface enclosure (+H0). The center 2-door section is the inverter enclosure (+H1). The right 1-door section is the DC interface enclosure (+H2). The 3 enclosures are constructed and delivered as one complete assembly.

Operator interface controls are located on the front door of the main inverter enclosure. These controls include an Emergency (E-STOP) pushbutton, a ⏻/I (stand-by/power-on) switch (called ON/OFF on older models), a 4-line display and a keypad called the universal frontpanel control unit (UFCU).

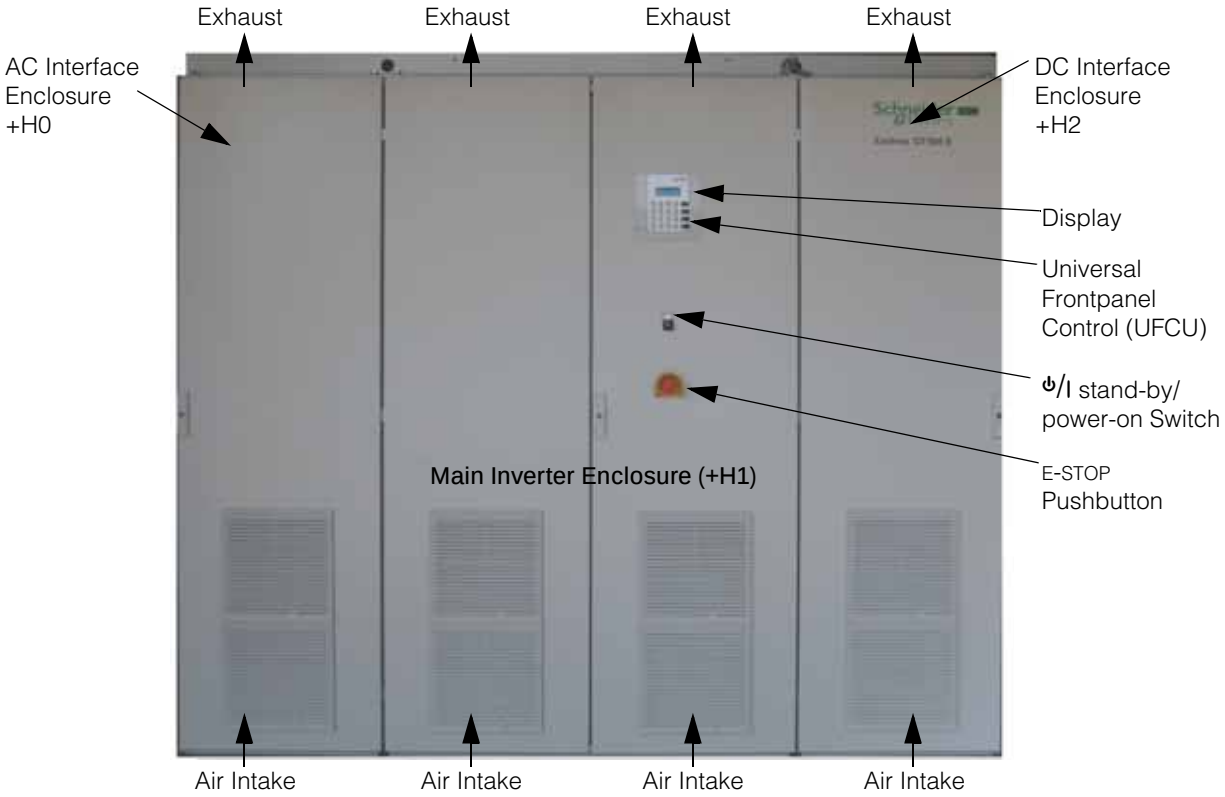

Figure 1-1 Xantrex inverter Operator Interface Components

WARNING: Multiple sources with risk of electric shock, explosion, and arc flash

The Xantrex inverter is energized from the PV array, from the AC grid, and from an auxiliary AC source (backed up with a Xantrex UPS for Xantrex GT500 E & Xantrex GT630 E units with low-voltage ride-through capability). All 3 sources (4 including a Xantrex UPS) must be disconnected, locked-out and tagged-out, and all circuits tested to verify that the inverter is fully de-energized, according to the procedure on page viii, before servicing or maintenance. Opening the AC and DC disconnect switches on the inverter does not remove all power from the inverter. Wait 20 minutes for the DC bus capacitors, located within the cabinet, to discharge after removing power.

⏻/I stand-by/power-on Switch

The Xantrex inverter incorporates a maintained position ⏻/I (stand-by/power-on) switch (called ON/OFF on older models) located on the right center door, under the main control display. Under normal conditions, the ⏻/I (stand-by/power-on) switch is in the I (power-on) position. Turning the switch to the ⏻ (stand-by) position initiates an immediate controlled shutdown of the Xantrex inverter and opens both the main AC contactor and DC disconnect switch within the unit. Turning the switch to the ⏻ (stand-by) position will not de-energize unit; it only stops power production. The main AC contactor and DC disconnect switch cannot be closed unless the switch is in the I (power-on) position. The Xantrex inverter is prevented from being restarted until the ⏻/I (stand-by/power-on) switch is turned back to the I (power-on) position.

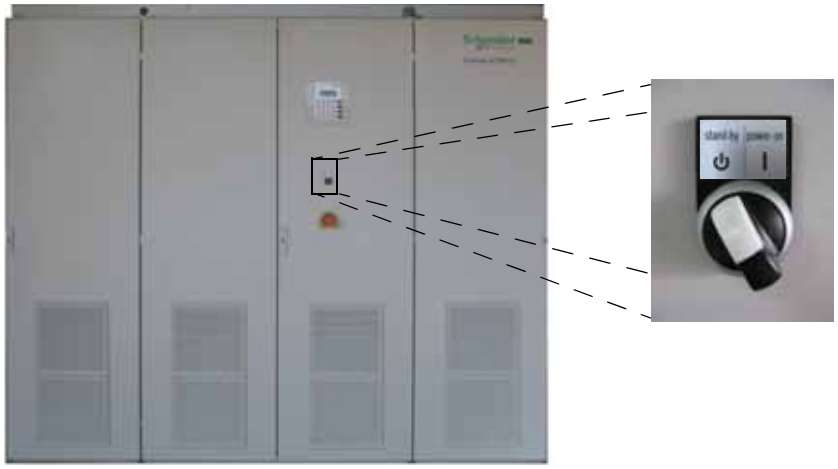

Figure 1-2 ⏻/I stand-by/power-on Switch

Emergency Stop (E-STOP)

The Xantrex inverter incorporates a maintained position E-STOP pushbutton located on the inverter enclosure. Under normal conditions, the E-STOP pushbutton is in the CLOSED (extended) position. Pushing the pushbutton to the OPEN (depressed) position initiates an immediate controlled shutdown of the Xantrex inverter and opens both the main AC contactor and DC disconnect switch within the unit. The main AC contactor and DC disconnect switch cannot be closed unless the pushbutton is in the CLOSED (extended) position. The Xantrex inverter is prevented from being restarted until the E-STOP pushbutton is in the CLOSED (extended) position.

Provisions are supplied for adding a remote emergency stop circuit.

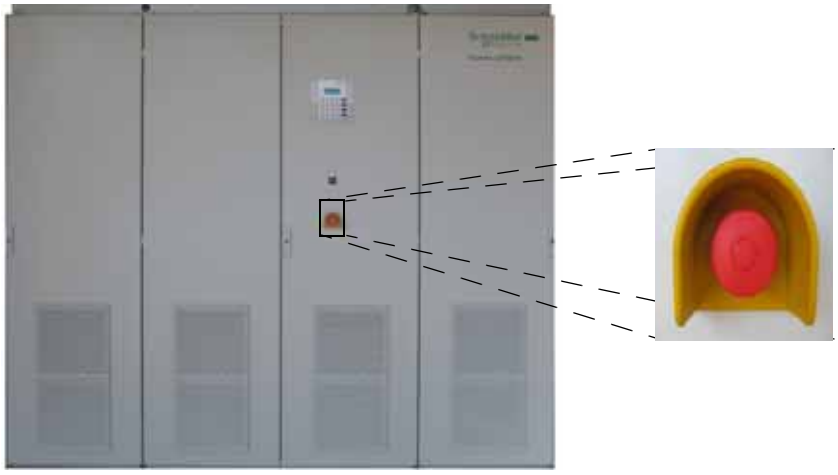

Figure 1-3 Emergency Stop

This manual is for use by qualified personnel only

AC and DC Disconnect Switches

WARNING: Multiple sources with risk of electric shock, explosion, and arc flash

The Xantrex inverter is energized from the PV array, from the AC grid, and from an auxiliary AC source (backed up with a Xantrex UPS for Xantrex GT500 E & Xantrex GT630 E units with low-voltage ride-through capability). All 3 sources (4 including a Xantrex UPS) must be disconnected, locked-out and tagged-out, and all circuits tested to verify that the inverter is fully de-energized, according to the procedure on page viii, before servicing or maintenance. Opening the AC and DC disconnect switches on the inverter does not remove all power from the inverter. Wait 20 minutes for the DC bus capacitors, located within the cabinet, to discharge after removing power.

The main AC disconnect switch is located inside the AC interface enclosure and the DC disconnect switch is located inside the DC interface enclosure. Additional external AC and DC disconnecting means, capable of being locked-out and tagged-out, must be provided as part of the installation, to facilitate safe servicing of the inverter.

The main AC and DC disconnect switches are each equipped with an auxiliary contact block which enables the switch to be used as a load break disconnect. In the event of a fault or if the inverter is shut off for any reason, the DC disconnect switch automatically opens, and it is capable of breaking the full DC load current.

For Xantrex GT500 E & Xantrex GT630 E units with UPS backup, the UPS breaker (-F5) is installed in the center (+H1) enclosure.

All Xantrex inverter enclosure doors must be closed and locked during normal operation.

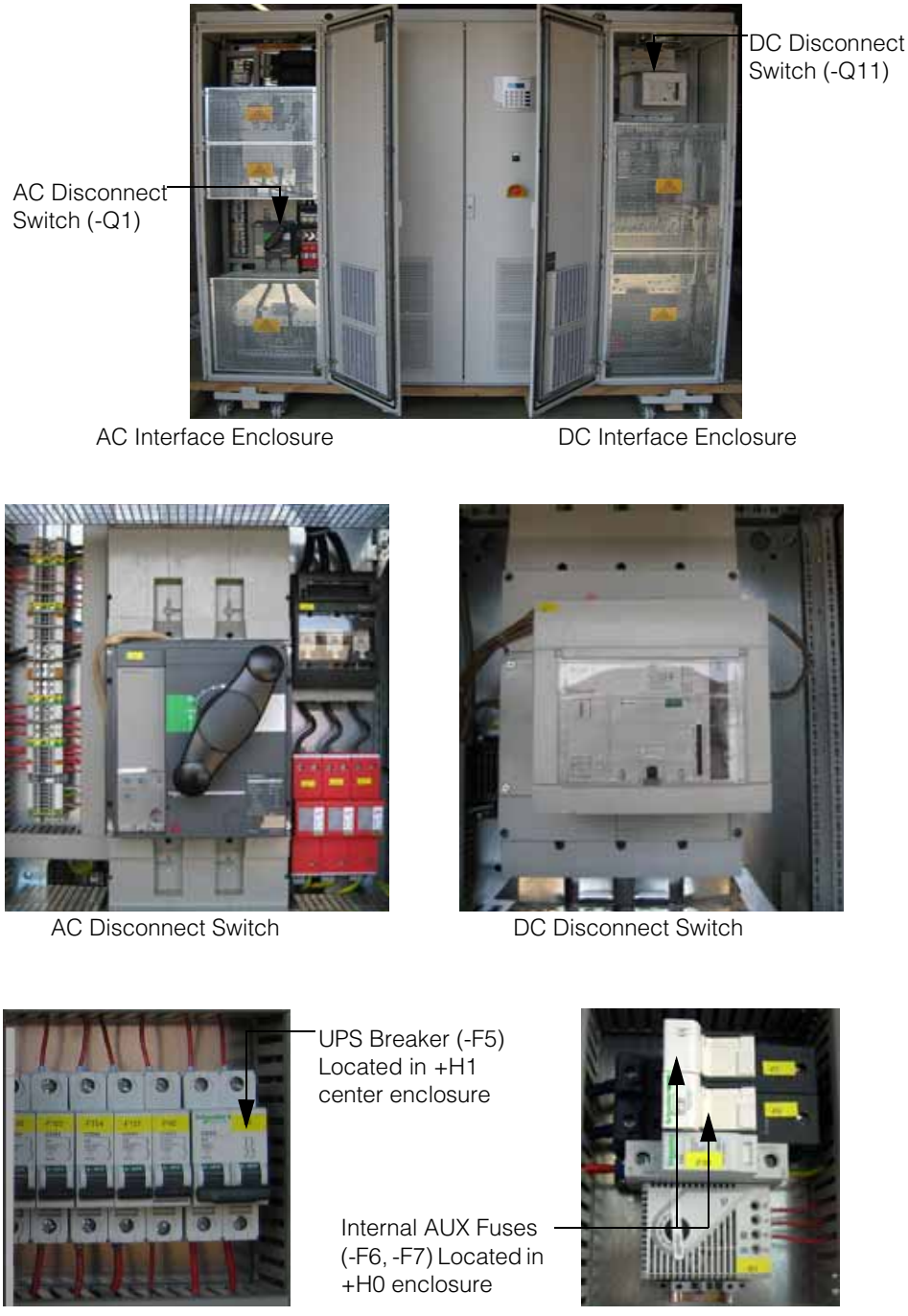

Figure 1-4 AC and DC Disconnect Switches, UPS Breaker and AUX Fuses

Communication Features and Methods

The Xantrex inverter provides two types of information to you:

- system status and/or fault information, and
- data logging information.

System status and fault information can be accessed using the Universal Front Panel Control Unit (UFCU) or an optional monitoring system. Data logging access requires the use of an optional monitoring system.

System Status and Fault Reporting

Basic system status and all fault conditions rising from within the Xantrex inverter are reported to the UFCU. The unit stores the time and details of all faults in non-volatile memory. The 4-line display shows a hexadecimal value and a brief text description of the fault.

The fault value is also made available to the optional monitoring system and has a more extensive description of the fault.

The UFCU keypad is located on the right center door to manipulate and view system operation and status. The keypad is comprised of 20 touch-sensitive keys that provide a means to navigate through the menus and alter user-changeable settings.

See the Xantrex GT500 E & Xantrex GT630 E Grid-Tied Photovoltaic Inverter Operation Manual (Part #: 975-0582-01-01) for details.

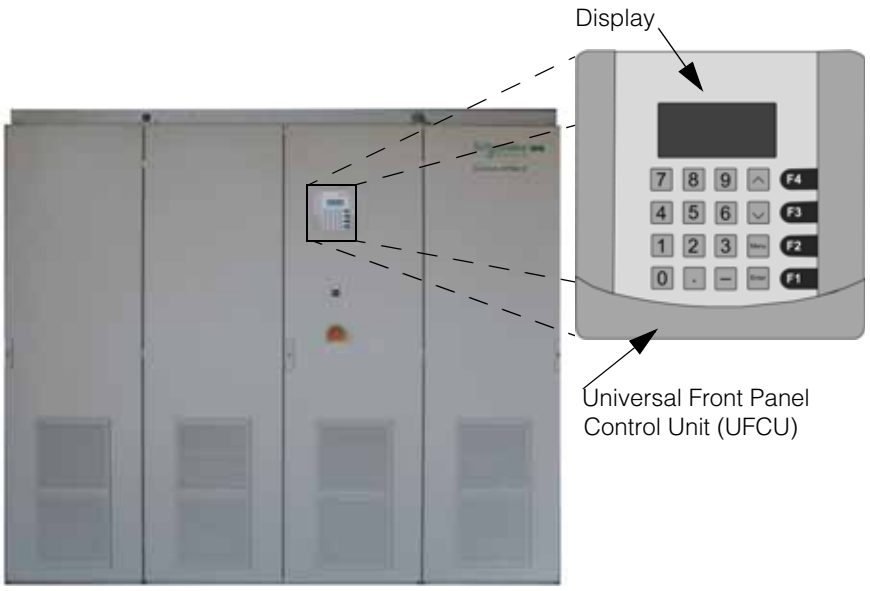

Figure 1-5 Display and UFCU Location

This information can also be accessed using an optional remote monitoring system.

Types of status information include:

- Current Operating State or Goal State
- Fault Code (if applicable)
- Inverter State
- Line Voltage and Current
- Inverter Matrix Temperature
- Inverter Power
- PV State
- PV Voltage and Current
- PV Power
- Grid Frequency
- Peak Power Tracker Enabled
- Software Upgrade
- Configurable Parameters

Data Logging

The inverter stores data values and software metrics for debugging. These values are stored within the control unit controller board in non-volatile memory. Data logging access requires the use of an optional monitoring connection.

The data logging features include:

- Operational Values
- Internal Metrics
- Data Log Acquisition
- Graphic Data Analysis
- Fault Log Acquisition

Monitoring Connection Methods

Computers can be used to access the system status, control and programming features of the Xantrex inverter. Computers can be connected either directly or remotely. Software is available to provide a graphic user interface that relates important system information using the appropriate optional hardware and software. This software is called Graphic Interface (GUI).

Direct Access Connection

The Xantrex inverter can be directly accessed by a computer or other RS232 devices. This connection requires using the optional RS232 Converter kit. The kit contains an RS232/FO converter configured for PC use with an adapter, a DB9/DB25 serial cable and a fiber optic harness.

Remote Access Connection

The Xantrex inverter can be remotely accessed through several methods such as a Local Area Network (LAN). Optional hardware and software is needed for these features.

2 Planning

Chapter 2, “Planning” provides information to help plan the installation of the Xantrex inverter.

Overview of Xantrex inverter Installation

WARNING: Risk of electrical shock, explosion, arc flash, and fire

Installations of this equipment should only be planned and performed by qualified personnel in accordance with all applicable installation codes. See page iii for the definition of qualified personnel.

Planning Planning for a system requires complete understanding of all the components that are involved to successfully install the Xantrex inverter to meet the all applicable installation codes and to ensure optimum system performance.

Definition A PV power system is a collection of devices designed to supply AC power to the utility grid from a solar energy (PV) source.

Components All types of grid-tied inverter installations, residential or industrial, share common components. This chapter describes each component and suggests the minimum requirements for a proper installation.

Location The Xantrex GT500 E 500 kW and Xantrex GT630 E 630 kW Grid-Tied Photovoltaic Inverters are designed to be installed in an indoor location. The Xantrex inverter must be anchored to a level, concrete floor or pad.

Clearance Adequate ventilation and service access must be taken into consideration when installing the Xantrex inverter. See “Site Requirements” for specific clearance requirements and ambient temperature requirements.

Site Requirements

The following site conditions must be established and maintained to ensure the safe and efficient installation, operation and servicing of the Xantrex inverter.

- Maintain a minimum clearance of 60 cm plus local safety requirements in front of the enclosure for air intake, maintenance and serviceability.
- External cabling enters the Xantrex inverter from the bottom. Either the Xantrex inverter needs to be placed over a foundation hole which holds the cables, or placed on top of a hollow platform which allows access to the bottom of the Xantrex inverter.
- The heat load of the Xantrex inverter is approximately 60,000 BTU/Hour at full load. External ventilation or air conditioning should be designed to keep the ambient air outside Xantrex inverter enclosure to a maximum of 45 °C (113 °F).

Conduit Entry

Conduit and cable entry is from the underside of the unit. Figure 2-1 shows a top view of the maximum allowable area and location in which electrical conduits may penetrate the enclosures of the Xantrex inverter. Conductor size must be pre-determined when the conduit is installed.

All measurements in mm

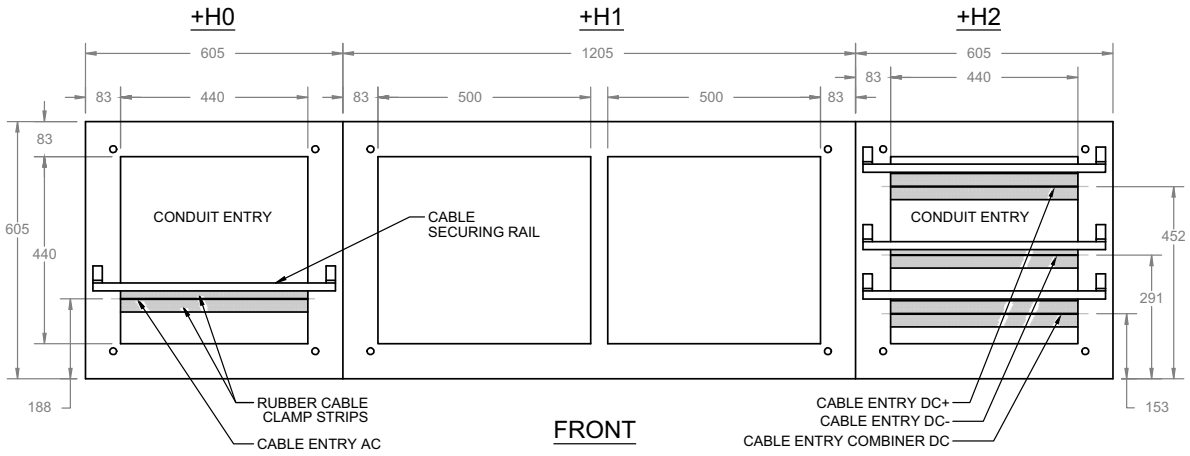

Figure 2-1 Enclosure Conduit Entries, Viewed from Top

If your configuration doesn't allow for conduit installation as described, contact your local representative or customer service for other installation options which may be approved for your configuration.

1000 Vdc Option Pre-installation

If you have a Xantrex GT630 E with 1000 Vdc input option, you need to install the resistor assembly in the sub-floor of the concrete PV box or pad. You must contact Schneider Electric for detailed instructions on installing the resistor for your specific installation.

Anchoring the Xantrex inverter

The Xantrex inverter is designed to be installed in an indoor location. It must be placed on and anchored to a level concrete floor or pad. The concrete floor or pad, upon which the Xantrex inverter is anchored, must be structurally designed to meet any local, state, or national requirements for weight, seismic, and wind sheer loading if applicable.

Twelve 16 mm holes are provided in the feet of the enclosure for anchoring to the floor or pad.

Figure 2-2 depicts the layout pattern of the anchoring holes for the Xantrex inverter inverter assembly.

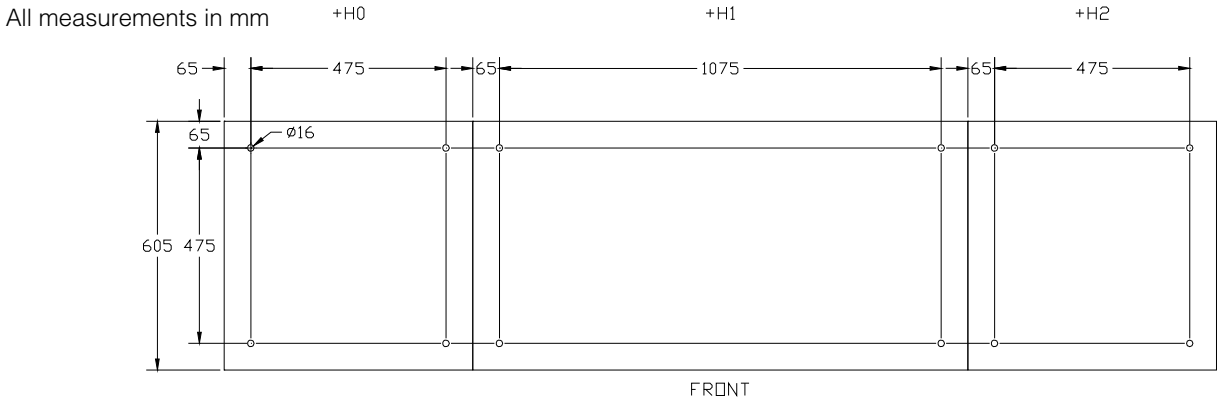

Figure 2-2 Main Inverter Anchor Bolt Pattern (Not to scale)

The floor or pad should either be pre-drilled to accept masonry anchors or have pre-installed anchoring bolts.

Grounding Requirements

The single-point safety ground (protective earth) connection point for the system is the AC ground bus bar (PE) in the AC interface enclosure, which must be connected to ground (earth) in the installation, in accordance with applicable installation codes. Ground connection points are also provided in the DC interface enclosure for the bonding wires that ground the PV array frames.

Utility Side Isolation Transformer Requirements

The Xantrex inverter must be used with a custom, high-efficiency, line-frequency isolation transformer between the inverter and the grid. This transformer is not provided and must be supplied as a separate component. The utility side winding of the isolation transformer may be configured Wye or Delta and must match the voltage at the utility interconnection point. If the utility side winding of the transformer is configured Wye; the neutral connection of the transformer may be connected to the neutral connection on the utility interconnect. Connection of this utility-side neutral does not affect the operation of the inverter. The inverter-side winding of the isolation transformer may also be configured Wye or Delta. If the inverter-side winding of the transformer is configured Wye and the transformer is equipped with a neutral at the inverter side, the neutral must not be terminated to the inverter or damage will occur.

CAUTION: Equipment Damage

Do not connect any point on the inverter-side winding of the isolation transformer to ground. Irreparable damage to the inverter will occur.

Electrical Diagrams

Since installations vary widely, a sample electrical diagram of the Xantrex GT500 E & GT630 E is provided in Figure 2-3. This diagram is to be used for system planning purposes only.

For more detailed information, refer to the illustrations inside the door of the enclosure for electrical schematics.

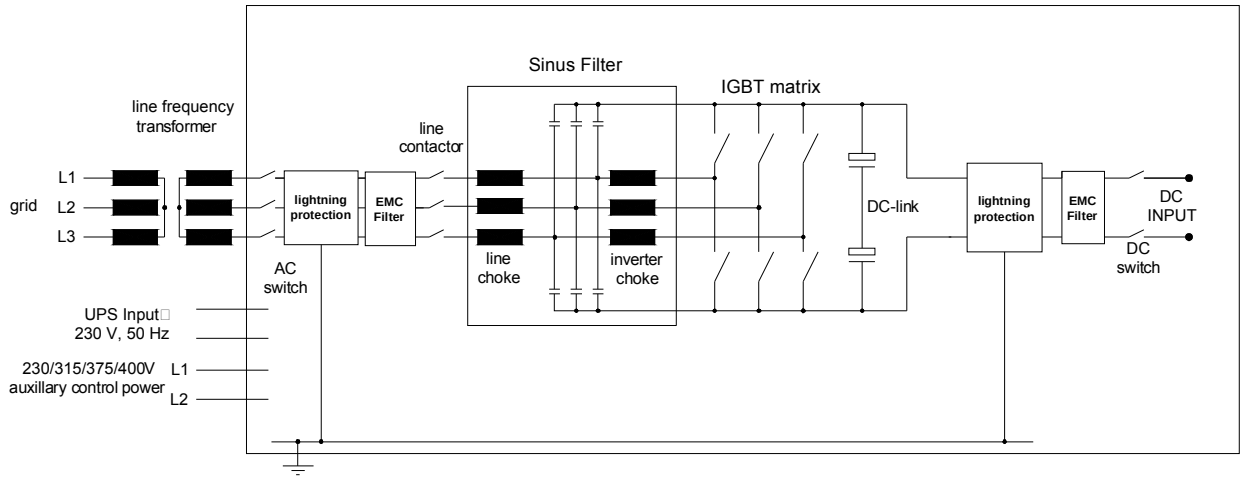

Figure 2-3 Xantrex inverter Electrical Diagram

3 Installation

Chapter 3, “Installation” describes the procedures needed to install the Xantrex inverter. This section includes unpacking and moving instructions, mounting instructions, and cabling instructions.

Unloading

WARNING: Risk of death, injury and equipment damage

- The Xantrex inverter weighs approximately 1800 kg. Attempting to lift or move the equipment by other than the recommended lifting points and methods may cause the equipment to drop or fall over, and may cause death or severe personal injury or property and equipment damage.
- Keep all the doors closed and latched when moving the enclosures.
- Use a forklift that has a minimum 2000 kg lift capacity and has a 66 cm fork span or use a crane.
- Use Figure 3-1 to locate the balance point (center of gravity) symbol.
- Damage caused by improper lifting or moving will void the warranty.

Figure 3-1 Center of Gravity

Unpacking the Xantrex inverter

To unpack the Xantrex inverter from the shipping crate:

1. Using a claw hammer or pry bar, remove the crate's wood top and side panels.
2. Remove the anchor hardware that attaches the Xantrex inverter to the shipping pallet.

Moving with a Forklift

Refer to Figure 3-1 for center of gravity information and Figure 3-2 for forklift locations.

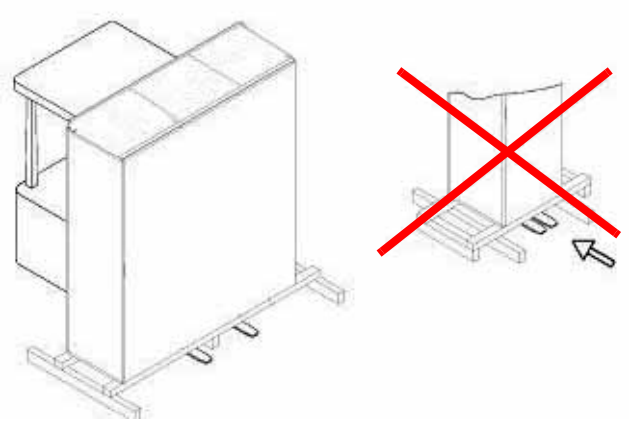

Figure 3-2 Forklift Lifting Locations - Underneath Unit

Moving with a Crane

To move the Xantrex inverter with a crane:

1. Attach the crane to the four anchor points on the rails.
2. Lift the enclosure into position.
3. Remove the lifting rails on top of the Xantrex inverter before operating the inverter.

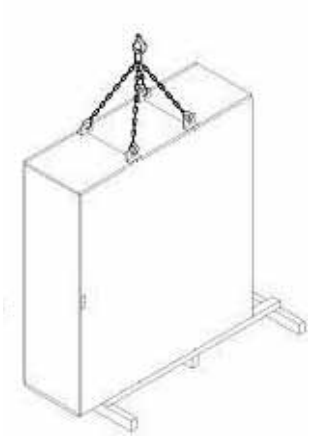

Figure 3-3 Lifting Using a Crane

Important: Before proceeding with the installation, determine the location and layout of the components, conduit penetration locations, conductor and conduit sizing, and method for anchoring the unit. Ensure adequate space is provided for clearance for ventilation and serviceability. Review Chapter 2, “Planning” if necessary before proceeding.

Mounting and Anchoring the Units

To mount and anchor the Xantrex inverter:

1. Predrill the floor or pad to accept masonry anchors for 12 mm bolts, or ensure it has pre-installed anchoring bolts that will fit the 16 mm mounting holes. See Figure 2-2 on page 2–4.
2. Lift the Xantrex inverter from beneath with a forklift or pallet jack as shown in Figure 3-2 on page 3–3, or lift the Xantrex inverter from above with a crane as shown in Figure 3-3 on page 3–3. Move the enclosure into place.
3. Secure the enclosure feet to the floor with the appropriate anchoring hardware.

Opening or Closing Access Doors

WARNING: Multiple sources with risk of electric shock, explosion, and arc flash

The Xantrex inverter is energized from the PV array, from the AC grid, and from an auxiliary AC source (backed up with a Xantrex UPS for Xantrex GT500 E & Xantrex GT630 E units with low-voltage ride-through capability). All 3 sources (4 including a Xantrex UPS) must be disconnected, locked-out and tagged-out, and all circuits tested to verify that the inverter is fully de-energized, according to the procedure on page viii, before servicing or maintenance. Opening the AC and DC disconnect switches on the inverter does not remove all power from the inverter. Wait 20 minutes for the DC bus capacitors, located within the cabinet, to discharge after removing power.

To lock or unlock any of enclosure doors on the inverter:

1. Use the key provided with the unit.
2. Insert the key in the lock and turn clockwise to open or counterclockwise to lock.
3. Pull the door open.

Figure 3-4 Inverter Enclosure Access Doors

Wiring - General

All wiring methods and materials shall be in accordance with applicable electrical installation codes, for example the US National Electrical Code ANSI/ NFPA 70, IEC 60364, CENELEC HD 384, or DIN VDE 0100.

WARNING: Risk of electric shock, explosion, and arc flash

The Xantrex inverter enclosures contain exposed conductors and parts operating at lethal voltage and at high enough energy to create an arc flash. Electrocution or severe burns may result. The enclosure doors should remain closed with the latches tightened, except during installation, maintenance or testing. These instructions are for use by qualified personnel. To reduce the risk of electric shock or arc flash, do not open any doors or remove any covers unless you are qualified to do so, are properly equipped with appropriate personal protective equipment, and have locked out and tagged out all sources of energy and verified that the inverter is de-energized. Do not open the cabinet doors if moisture is present (rain or heavy dew).

WARNING: Multiple sources with risk of electric shock, explosion, and arc flash

The Xantrex inverter is energized from the PV array, from the AC grid, and from an auxiliary AC source (backed up with a Xantrex UPS for Xantrex GT500 E & Xantrex GT630 E units with low-voltage ride-through capability). All 3 sources (4 including a Xantrex UPS) must be disconnected, locked-out and tagged-out, and all circuits tested to verify that the inverter is fully de-energized, according to the procedure on page viii, before servicing or maintenance. Opening the AC and DC disconnect switches on the inverter does not remove all power from the inverter. Wait 20 minutes for the DC bus capacitors, located within the cabinet, to discharge after removing power.

CAUTION: Equipment Damage

When connecting external AC wires to the Xantrex inverter, positive phasing sequence must be maintained throughout the installation process. Refer to the system schematics in the unit enclosure for proper phasing convention.

The Xantrex inverter has a three-phase output.

Conductor size should have been pre-determined when the conduit was installed. Prepare the appropriate length conductors for each connection.

Overcurrent Protection

Overcurrent protection for the PV input, AC output, auxiliary AC input and UPS wiring must be provided by the installer. The value of the overcurrent protection must be determined by the installer based on the applicable installation codes, the current involved (see Appendix A, “Specifications”), the wiring size used, and any other system parameters required by the installation codes.

Conductor Termination

The Xantrex inverter has terminals and bus bars for making all wiring connections required for the installation. All terminals used for making AC and DC connections require the use of copper conductors with an insulation rating of 90 °C (or higher). If conductors with insulation rated higher than 90 °C are used, base the wire size on the requirements for 90 °C wire, to prevent excessive heating of the busbars, terminals, and connected devices. For bolt size, and torque values for the AC terminals, see Table A-5 on page A–5. For bolt size, and torque values for the DC terminals, see Table A-6 on page A–5.

AC Wiring

The AC output wiring connects to the AC terminals in the AC interface enclosure (+H0) identified as L1, L2, L3. These terminals require the use of a crimp-on type ring terminal or compression-type lug. Keep these cables together as much as possible and ensure that all cables pass through the same knockout and conduit fittings, allowing any inductive currents to cancel. The AC line terminals in the AC interface enclosure (L1, L2, and L3) have three bolts per pole and accommodate a maximum of two cables per bolt.

For torque values, see Table A-5 on page A–5. See Figure 3-6 on page 3–8 for the location of these terminals.

The auxiliary AC input wiring connects to the control voltage terminals in the AC interface enclosure identified as -X2:L1 and -X2:L2. The auxiliary AC input terminals are one wire per terminal (-X2:L1, -X2:L2). These terminals require a crimp-on ferrule properly sized for the wire.

For torque values, see Table A-5 on page A–5. See Figure 3-7 on page 3–10 for the location of these terminals.

If a Xantrex UPS is used, remove the links on -X2 between terminals -X2:23 and -X2:24 and between -X2:25 and -X2:26. Connect the output of the Xantrex UPS to terminals -X2:24 (L) and -X2:26 (N) and the input of the Xantrex UPS to either terminals -X2:23 (L) and -X2:25 (N), or an external 230 V/50 Hz supply capable of providing more than 0.5 KVA. The input UPS control voltage are one wire per terminal (-X2:24, -X2:26). These terminals require a crimp-on ferrule properly sized for the wire.

See Figure 3-7 on page 3–10 for the location of these terminals.

DC Wiring

The PV input wiring connects to the DC terminals located in the DC interface enclosure (+H2). These terminals requires the use of a crimp-on type ring terminal or compression-type lug. Keep these cables together as much as possible and ensure that all cables pass through the same knockout and conduit fittings, allowing any inductive currents to cancel. The DC terminals in the DC interface enclosure (PV+ and PV-) have eight bolts per pole and a maximum of one cable per bolt.

For torque values, see Table A-6 on page A–5. See Figure 3-9 on page 3–12 for the location of these terminals.

Grounding

The connection point for the AC grounding conductor (also known as PE – protective earth) is a copper grounding bar with several 12 mm bolts located in the AC interface enclosure and marked with PE. The ground conductor size depends on the size of the main circuit breaker. Refer to local applicable electrical installation codes for grounding requirements for your system. Grounding terminals for PV array frames are provided in the DC interface enclosure.

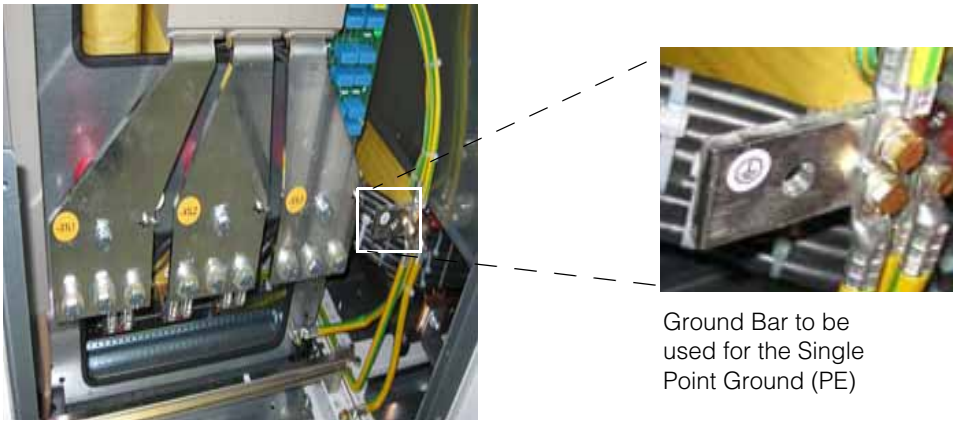

Figure 3-5 Single Point Ground (PE); Ground Bar

Wiring - Specific

This section provides information for connecting the AC and DC conductors and the ground conductors. Table A-5 and Table A-6 on page A–5 show the specifications of the AC and DC wiring.

Overcurrent protection for the AC and PV wiring, the external transformer, and other devices in the system must be provided by the installer, based on the current in the system (see Appendix A, “Specifications””), the wiring size used, the ratings of other devices in the system, and in accordance with all applicable installation codes.

To connect the transformer to AC interface enclosure:

1. Follow the lock-out and tag-out procedures on page viii.
2. Open the door of the AC interface enclosure.
3. Route the AC power conductors L1, L2, L3 and ground cable(s) through the conduit from the transformer to the AC interface enclosure.
4. Connect the ground conductors to the ground bar (PE). Terminations for the ground conductors within the AC interface enclosure at the ground bar are made with M12 hardware. Cables to these terminals must use a crimp-on type ring terminal or compression-type lug. See Figure 3-6 for the location of these terminals.
5. Connect the AC power conductors at the L1 (A phase), L2 (B phase), and L3 (C phase) terminals using the M12 hardware. Cables to these terminals must use a crimp-on type ring terminal or compression-type lug. See Figure 3-6 for the location of these terminals.

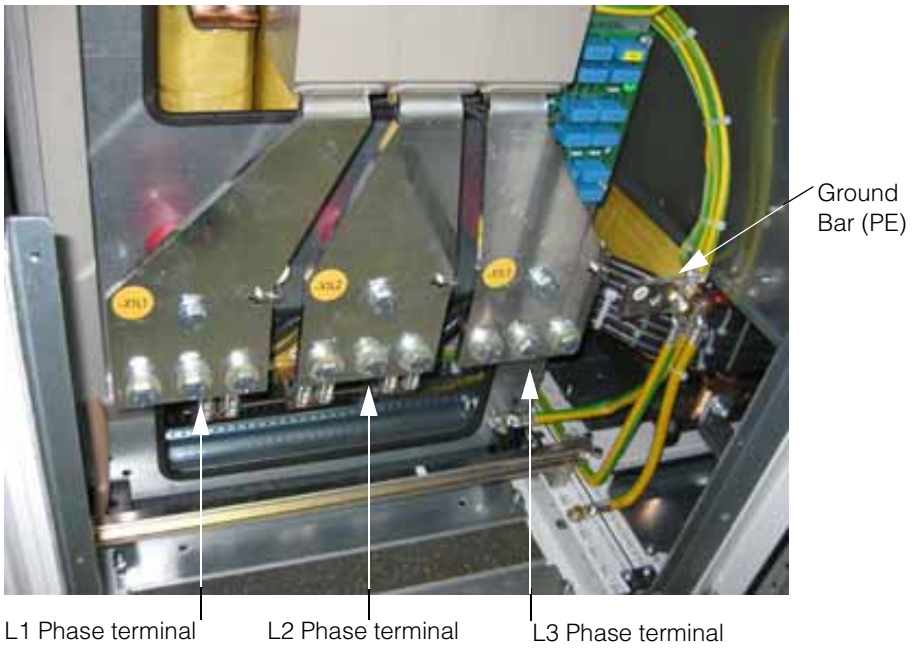

Figure 3-6 AC Terminal Connections from the External Transformer

The auxiliary supply transformer (-T6) has several primary taps. The tap must be selected to match the auxiliary control voltage supplied to the unit, 230, 315, 375 or 400 V depending on model and system details. The control voltage transformer comes pre-wired based on the output voltage. If you want to supply the auxiliary supply voltage from an external supply (for example, housekeeping power for a whole PV station/box) then the existing connection at the primary must be removed and the external supply should be connected accordingly. In most cases an external supply is 230 Vac/50 Hz therefore it should be connected to 230 primary tap. The transformer is located in the AC interface enclosure. See Figure 3-8 on page 3–10 for the location of -T6.

To connect the auxiliary supply voltage to AC interface enclosure:

1. Follow the lock-out and tag-out procedures on page viii.
2. Open the door of the AC interface enclosure.
3. Route the auxiliary supply voltage conductors –X2:L1 and -X2:L2 through the conduit from the source to the AC interface enclosure.
4. Connect the auxiliary supply voltage conductors to the appropriate terminals of the –X2 terminal block. These conductors must use crimp-on type Ferrules as specified in Table A-5. See Figure 3-7 for the location of these terminals.
5. If the unit system is provided with a remote emergency stop (E-STOP) switch, route the conductors from the switch to the AC interface enclosure. These conductors terminate on -X2:6 and -X2:7 and on -X2:8 and -X2:9. Both sets of terminals need to be switched by the remote emergency stop switch. If the system does not have a remote E-STOP switch, a jumper must be installed between -X2:6 and -X2:7 and between -X2:8 and -X2:9. For torque specifications for this terminal block see Table A-6 on page A–5.

To select the correct voltage tap for the control voltage transformer (-T6):

1. Follow the lock-out and tag-out procedures on page viii.
2. Open the door of the AC interface enclosure
3. Remove any existing connections at the primary side of -T6 and replace as follows:
   a) Xantrex GT500 E: The Xantrex GT500 E is designed to operate at the nominal voltage of 315 Vac +/-10%, therefore the control voltage should be supplied from 330 and -15% taps primary. See Figure 3-8 for the location of the terminal block of (-T6). Make sure wiring is correct. For torque specifications for this terminal block see Table A-6 on page A–5.
   b) Xantrex GT630 E: The Xantrex GT630 E is designed to operate at the nominal voltage of 375 Vac +/-10%, therefore the control voltage should be supplied from 375 and 0 taps primary, and secondary to 230 V tap. See Figure 3-8 for the location of the terminal block of (-T6). Make sure wiring is correct. For torque specifications for this terminal block see Table A-6 on page A–5.
4. Close the door of the AC interface enclosure.

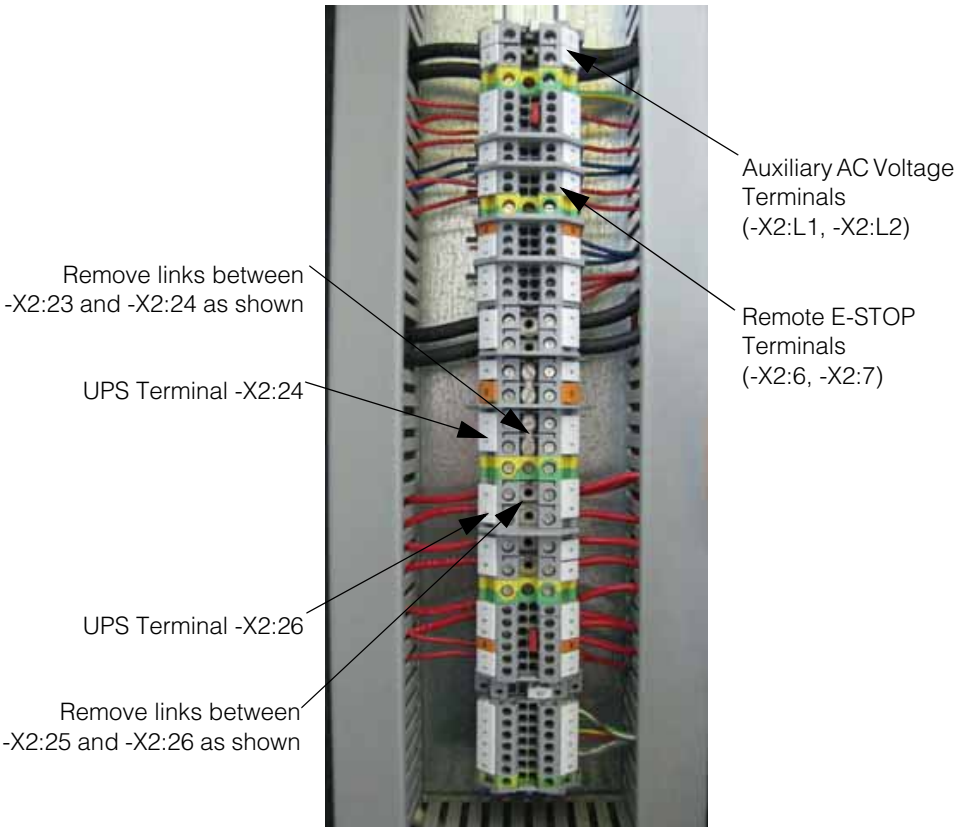

Figure 3-7 Auxiliary AC Voltage Terminal Connections

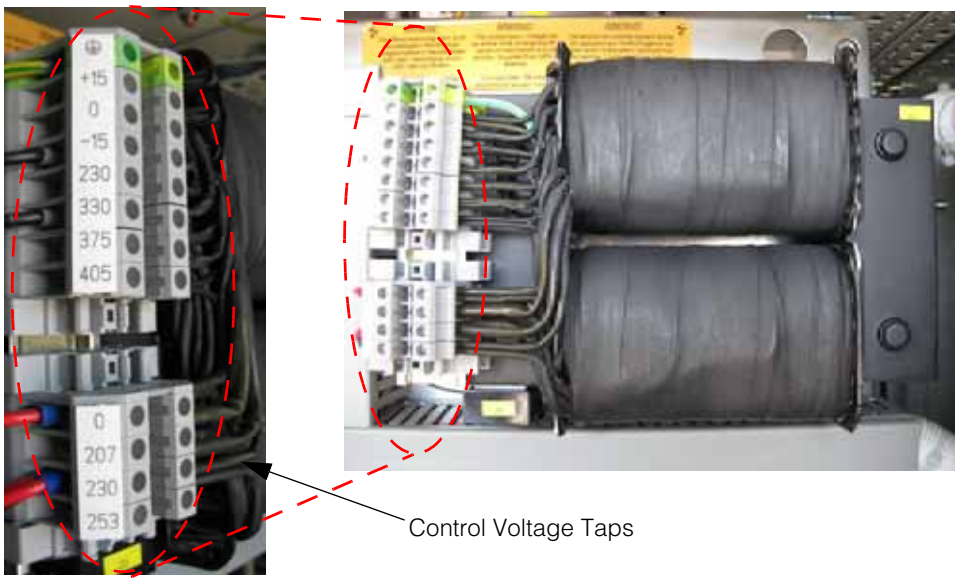

Figure 3-8 Control Voltage Transformer Primary and Secondary Wiring

1000 Vdc Input Option

If you have a Xantrex GT630 E with 1000 Vdc input option your inverter is configured with the following pre-installed conductors:

- 1 cable with cross section of 35mm^2 (coming from PV+)
- 3 cables with cross section of 10mm^2 coming from the chopper IGBT's

These conductors are located cabinet +H2, coiled on the bottom. You must connect these wires to the resistor that was installed in the sub-floor of the concrete PV box or pad as described on page 2–3.

Uninterruptable Power Supply Installation

If you have a Xantrex GT500 E or Xantrex GT630 E with optional ride-through capability you need to install a UPS for operation. You can order an appropriate UPS from Schneider Electric (part number: 820-0031-01-01) if you are using 230 Vac auxiliary supply voltage in your installation, or you can use any UPS which meets the requirements in Table A-7 on page A–5 and matches the auxiliary supply voltage for your installation.

Refer to Figure 3-7 and Figure 3-8 to locate the connection points.

PV Array Connections

To make the connections from the PV array/combiner to DC interface enclosure:

1. Follow the lock-out and tag-out procedures on page viii.
2. Open the door of the DC interface enclosure.
3. Route the POSitive (PV+) and NEGative (PV-) PV array conductors through the conduit to the DC interface enclosure and enter through the opening on the bottom.
4. The DC power conductors should be terminated at the PV+ and PV- terminals. Polarity must be observed. See Figure 3-9.
5. Terminations for the POSitive, NEGative, and PV array frame ground conductors within the DC interface enclosure are made using the 12 mm screw bolts. Conductors must be provided with crimp-on ring terminals or compression lugs. Torque the M12 bolts per Table A-6 on page A–5.
6. Close the door of the DC interface enclosure.

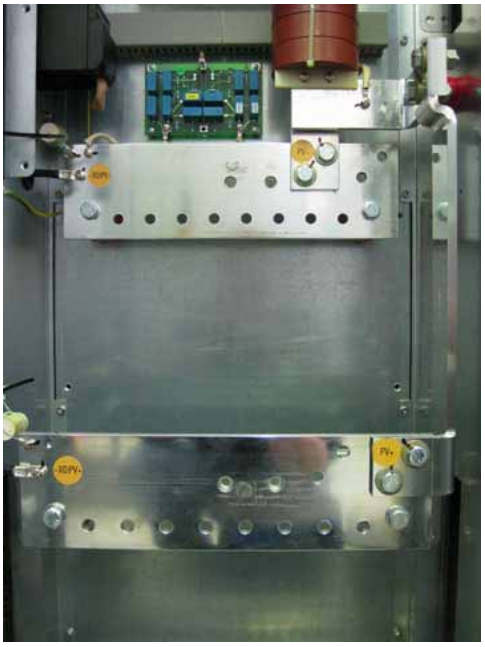

Figure 3-9 PV Array Cable Routing and Terminations

4 Verification

Chapter 4, “Verification” provides a checklist to ensure the installation of the Xantrex inverter is correct and complete.

Verification Procedure Summary

The following procedures are intended to verify correct installation and proper wiring of the Xantrex inverter. Prior to performing the following verification steps on the Xantrex inverter, review all safety requirements and procedures outlined in this manual and on any cautionary markings on the components within the system.

WARNING: Risk of electric shock, explosion, and arc flash

Before beginning verification of the Xantrex inverter read all instructions, cautionary markings, and all other appropriate sections of this manual. Exercise extreme caution at all times to prevent accidents. These instructions are for use by qualified personnel as defined on page iii.

Failure to follow these instructions will result in death or serious injury.

WARNING: Risk of electric shock, explosion, and arc flash

The Xantrex inverter enclosures contain exposed conductors and parts operating at lethal voltage and at high enough energy to create an arc flash. Electrocution or severe burns may result. The enclosure doors should remain closed with the latches tightened, except during installation, maintenance or testing. These instructions are for use by qualified personnel. To reduce the risk of electric shock or arc flash, do not open any doors or remove any covers unless you are qualified to do so, are properly equipped with appropriate personal protective equipment, and have locked out and tagged out all sources of energy and verified that the inverter is de-energized. Do not open the cabinet doors if moisture is present (rain or heavy dew).

WARNING: Multiple sources with risk of electric shock, explosion, and arc flash

The Xantrex inverter is energized from the PV array, from the AC grid, and from an auxiliary AC source (backed up with a Xantrex UPS for Xantrex GT500 E & Xantrex GT630 E units with low-voltage ride-through capability). All 3 sources (4 including a Xantrex UPS) must be disconnected, locked-out and tagged-out, and all circuits tested to verify that the inverter is fully de-energized, before servicing or maintenance, as described on page viii. Opening the AC and DC disconnect switches on the inverter does not remove all power from the inverter. Wait 20 minutes for the DC bus capacitors, located within the cabinet, to discharge after removing power.

Inspect the following items prior to completion of the installation:

1. Visually inspect all the mechanical connections. This would include both electrical conduit fittings, as well as enclosure anchoring and seismic bracing if required.
2. Visually inspect the electrical connections and verify proper tightness of all terminations.
3. Visually inspect the utility transformer connections. The inverter-side windings of the transformer can be Wye or Delta. Do not connect any point of the inverter-side winding to ground.
4. Perform corrective actions if required.

Visual Inspection of Mechanical Connections

To perform a visual inspection of the Xantrex inverter's mechanical connections:

1. Ensure any required seismic bracing and all anchor bolts are properly tightened and in place. ❒
2. Unlatch and open the doors of the inverter enclosure, the AC and DC interface enclosures and visually inspect for damage and loose wires. ❒
3. Verify all conduit fittings are properly tightened. ❒

Visual Inspection of Electrical Connections

To perform a visual inspection of the Xantrex inverter's electrical connections:

1. Ensure that all circuits are locked-out and tagged-out by following the procedures on page viii. ❒
2. Ensure all conductors and wiring connections interfacing with the Xantrex inverter are tightened to the correct torque value.
   For specific torque values, see Table A-5 and Table A-6 on page A–5. ❒
3. Verify the AC power conductors terminated at L1, L2, L3 within the AC interface enclosure are terminated correctly and sequenced L1-L2-L3. ❒
4. Verify the AC control power conductors terminated at -X2:L1 and -X2:L2 and the remote E-STOP switch or jumper terminated at -X2:6 and -X2:7 as well as -X2:8 and -X2:9 within the AC interface enclosure are terminated correctly and tightened to the correct torque value. For specific torque values, see Table A-5 on page A–5. ❒
5. Verify that the proper tap is selected on auxiliary supply transformer -T6, as described on page 3–9. ❒
6. Verify DC power conductors terminated at PV+ and PV- within the DC interface enclosure are terminated correctly and properly polarized. ❒

Corrective Action

Perform after initial inspection (if required):

1. Take minor corrective actions as per instructions outlined in the previous paragraphs. For more significant corrective actions, contact Schneider Electric customer service.
2. Ensure that the AC and DC disconnect switches, as well as any utility interconnect circuit breaker, main disconnect circuit breaker and/or AC control power disconnect are left locked-out and tagged-out.
3. Close and latch the doors of the inverter enclosure, the AC and DC interface enclosures.
4. Inform Schneider Electric's customer service regarding corrective actions taken (provide details, take photos prior and after the repair) and seek permission from Schneider Electric to engage the unit.

Energize Procedure (Startup)

To start up the Xantrex inverter:

1. Ensure nobody is working on any circuits in the system, and that the inverter cabinet and all other enclosures are closed and secured.
2. Remove any lockout devices from the utility connection circuit breaker and DC disconnect switch.
3. Remove any lockout devices from the auxiliary control power disconnect and energize the auxiliary control power.
4. Close the utility connection circuit breaker.
5. Close the AC disconnect switch.
6. Verify the E-STOP pushbutton is in the CLOSED (extended) position.
7. If a remote E-STOP is installed, verify it is in the CLOSED position.
8. Turn the ⏻/I (stand-by/power-on) switch (called ON/OFF on older models) to the I (power-on) position.

After a 15 second initialization period, the Xantrex inverter automatically transitions to 'Waking Up', given the PV voltage is greater than the PV V Start set point.

5 Advanced Troubleshooting

Chapter 5, “Advanced Troubleshooting” contains information and procedures for qualified personnel to troubleshoot the Xantrex inverter.

It provides descriptions of common situations and errors that may occur and provides possible solutions for resolving fault conditions.

It also provides instructions for clearing faults manually, if required.

WARNING: Multiple sources with risk of electric shock, explosion, and arc flash

The Xantrex inverter is energized from the PV array, from the AC grid, and from an auxiliary AC source (backed up with a Xantrex UPS for Xantrex GT500 E & Xantrex GT630 E units with low-voltage ride-through capability). All 3 sources (4 including a Xantrex UPS) must be disconnected, locked-out and tagged-out, and all circuits tested to verify that the inverter is fully de-energized, according to the procedure on page viii, before servicing or maintenance. Opening the AC and DC disconnect switches on the inverter does not remove all power from the inverter. Wait 20 minutes for the DC bus capacitors, located within the cabinet, to discharge after removing power.

Faults and Fault Codes

Fault states are automatic from any state of operation. In the event of a fault condition, the Xantrex inverter immediately stops processing power and executes an immediate orderly shutdown, opens both the main AC contactor and DC disconnect switch, and remains in a faulted state until the fault is remedied and cleared (manually or automatically).

In the event of an alarm or fault condition, the Xantrex inverter executes an immediate, orderly shutdown and remains in a faulted state until the alarm or fault is remedied and cleared (manually or automatically).

- Faults associated with a grid disturbance clear automatically. The Xantrex inverter automatically re-starts after a 5-minute delay.
- All other faults must be cleared manually.

All fault conditions detected by the Xantrex inverter are reported to the UFCU (Universal Frontpanel Control Unit). The 4-line display shows a hexadecimal value (fault code) and a brief text description of the fault.

Most faults are latching and only those faults associated with grid disturbances are auto-clearing and thus enable the Xantrex inverter to restart after a 5 minute delay period.

Once the cause of the fault has been identified and corrected, and it is determined to be safe to proceed, Xantrex inverter faults may be manually cleared from the UFCU keypad or using the remote monitoring connection. See “Clearing Faults Manually” on page 5–3 for instructions on this procedure.

General Troubleshooting

Respond to any Xantrex inverter alarm or fault as follows:

1. Note and document the alarm or fault code and brief text description.
2. Determine the source of the alarm or fault by referring to Table 5-1 on page 5–4.
3. Rectify the alarm or fault condition and attempt to clear the fault from the display. See page 5–3 for instructions on this procedure.
4. If the condition is sustained and cannot be corrected, again note and document the fault code and description, and contact either your Distributor / Reseller, or Customer Service.

Automatically Clearing Faults

Faults associated with a grid disturbance clear automatically. These faults include:

- 0010 (AC Frequency Low)
- 0011 (AC Frequency High)
- 0012 AC Voltage Low)
- 0013 (AC Voltage High)
- 0015 (Grid Disconnection)
- 0021 (PV Over Voltage)
- 0023 (Bus Voltage High)
- 0035 (Fault Class 35: PV Ground Insulation or Enclosure Temperature Low and Humidity High)

Once the values return to within the acceptable range, the Xantrex inverter clears the fault and automatically restarts after a 5-minute delay.

Clearing Faults Manually

All other faults not associated with a grid disturbance must be identified, corrected and then cleared manually using the UFCU or the remote monitoring connection. The following procedure describes how to manually clear a fault message from the display.

To clear the fault:

1. Determine the source of the fault using Table 5-1, “Fault Codes” on page 5–4. Correct the fault condition.
2. Ensure the fault code and “Clear Fault?” message is shown in the display.
   a) If the “Clear Fault?” message is not shown on the second line of the display, scroll through the read parameter menu with the /\ or \/ keys until the message appears.
3. To clear the fault, press <**ENTER**>. The Xantrex inverter transitions to Sleeping mode.

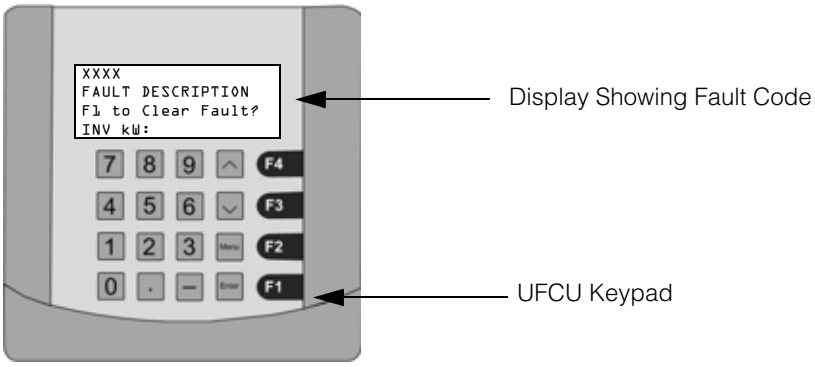

Figure 5-1 Display Showing Fault Code

Important: If the fault does not clear, the fault condition has not been corrected.

Fault Code Descriptions

Table 5-1 provides a complete description of all the fault conditions that may occur on the Xantrex inverter. Default values are shown, but some limits are user-adjustable.

Table 5-1 Fault Codes

Error Code	Fault Source(s)	Fault Type H=Hardware S=Software	Fault Description	Possible Causes
0000	No Faults	N/A	N/A	N/A
0010	AC Frequency Low	S	This fault indicates that the Utility grid frequency is below or fell below the setting of Min AC Freq: for greater than 6 cycles. This fault is auto-clearing. Once the Utility grid frequency has recovered within the acceptable operating range, the Xantrex inverter qualifies the value and automatically clears this fault and resumes normal operation after 5-minute delay period.	• Utility grid frequency fell below the allowable limit
0011	AC Frequency High	S	This fault indicates that the Utility grid frequency is above or rose above the setting of Max AC Freq: for greater than 6 cycles. This fault is auto-clearing. Once the Utility grid frequency has recovered within the acceptable operating range, the Xantrex inverter qualifies the value and automatically clears this fault and resumes normal operation after 5-minute delay period.	• Utility grid frequency rose above the allowable limit

Table 5-1 Fault Codes

Error Code	Fault Source(s)	Fault Type H=Hardware S=Software	Fault Description	Possible Causes
0012	AC Voltage Low	S	This fault indicates that the utility grid voltage is below or fell below the setting of Min AC Volt%: of nominal Vac for greater than 6 cycles. Xantrex inverter units with the low voltage ride-through option are able to continue to supply current through the fault for 1600 ms as long as the voltage does not drop below 5% of nominal Vac. This fault is auto-clearing. Once the utility grid voltage has recovered within the acceptable operating range, the Xantrex inverter qualifies the value and automatically clears this fault and resumes normal operation after a 5 minute delay period.	• Utility grid voltage fell below the allowable limit • P1001 on control unit is loose or disconnected
0013	AC Voltage High	S	This fault indicates that the utility grid voltage is above or rose above the setting of Max AC Volt%: of nominal Vac for greater than 6 cycles. This fault is auto-clearing. Once the utility grid voltage has recovered within the acceptable operating range, the Xantrex inverter qualifies the value and automatically clears this fault and resumes normal operation after 5 minute delay period.	• Utility grid voltage rose above the allowable limit
0015	Grid Disconnection	S	This fault indicates that the Xantrex inverter has detected a sudden AC voltage increase of greater than 40% of the nominal peak-to-peak value. This normally is the result of a sudden disconnection from the Utility grid while the Xantrex inverter was processing power.	• -Q1 was opened while the Xantrex inverter was processing power or an upstream disconnect was opened
0016	DC Disconnect Switch	S	This fault indicates that upon entering the Power Tracking State, the Xantrex inverter has detected that the DC disconnect switch is in the wrong state.	• -Q11 is inoperable • -K31 is inoperable

Table 5-1 Fault Codes

Error Code	Fault Source(s)	Fault Type H=Hardware S=Software	Fault Description	Possible Causes
0017	Phase Error	S	The calculated frequency is negative indicating the phase rotation of the grid is incorrect. The correct rotation is L1, L2, L3	Phase Rotation of the incoming grid connections is wrong.
0018	AC Contactor Circuit Fault	S	Xantrex GT500 E GI and Xantrex GT630 E GI only: An Auxiliary contact is used to determine the state of -K1. This fault indicates the Xantrex GT500 E GI and Xantrex GT630 E GI has detected the contactor is not in the correct state.	-K1 or -K33 is inoperable
0019	PV Over-I Positive	H	This fault indicates that the Xantrex inverter has detected a DC current in the Positive connection to the Unit greater than the maximum allowed of 1300 amps	• -T13 is inoperable • P3 on control unit is loose or disconnected • PV system wiring short
0020	PV Over-I Negative	H	This fault indicates that the Xantrex inverter has detected a DC current in the negative connection to the Unit greater than the maximum allowed of 1300 amps.	• -T14 is inoperable • P3 on control unit is loose or disconnected • PV system wiring short
0021	PV Over-Voltage	S	This fault indicates that the Xantrex inverter has detected a DC input voltage of greater than the maximum allowed value of 1100 Vdc.	• PV system mis-wiring • Lightning strike on PV system wiring
0023	Bus Voltage High	H	This fault indicates that the Xantrex inverter has detected that the DC bus voltage has exceeded the maximum allowed value of 1020 Vdc.	• PV system mis-wiring • Lightning strike on PV system wiring

Table 5-1 Fault Codes

Error Code	Fault Source(s)	Fault Type H=Hardware S=Software	Fault Description	Possible Causes
XX30	Matrix Over-Current	H	This fault indicates that the Xantrex inverter has detected that the AC current on one or more phases of the inverter output has exceeded the maximum allowed value of $2000A_{pk}$. The first two digits of the fault code indicate the particular phase where the over-current occurred as follow: • 0130 - Matrix over-current in phase A • 0230 - Matrix over-current in phase B • 0430 - Matrix over-current in phase C If more than one phase faults simultaneously, the two first digits are added in hexadecimal form to indicate an over-current condition in more than one phase, thus the error code contains the summation of the faulted phases.	• P3 on control unit is loose or disconnected • AC system wiring short
0033	Ground Over-Current	S	This fault indicates that the Xantrex inverter has detected that the ground fault current has exceeded the setting of Max Gnd Flt I:.	• P3 on control unit is loose or disconnected • Fault between ground and live parts of the AC or DC system
XX34	Unused Matrix Over-I	H	This fault indicates that the inverter has detected a control unit board failure.	This indicates a problem on the control unit board.
0035	Fault Class 35	S	The Bender relay has detected the impedance between ground and the PV array has dropped below the setting of the Bender relay. Alternatively the enclosure temperature is too low and humidity is too high.	• Damaged insulation between the array and ground, or inadvertent grounding of the array or excessive moisture on the array. • Cabinet temperature or cabinet humidity is outside allowable range.

Table 5-1 Fault Codes

Error Code	Fault Source(s)	Fault Type H=Hardware S=Software	Fault Description	Possible Causes
0040	Programming Software	S	This code indicates that the Xantrex inverter has detected that the system is in Programming mode. This fault does not indicate any malfunction with the Xantrex GT500 E & Xantrex GT630 E, but is merely an indication that the system software is in the process of being downloaded into the EEPROMs of the control unit.	
0041	State Invalid	S	The state machine implemented within the control unit system software governs the operation of the Xantrex GT500 E & Xantrex GT630 E. This fault indicates that the Xantrex inverter has detected an unknown system variable and has encountered an invalid state.	• Internal RAM error • CPU error
0042	Serial EEPROM Write Error	S	This fault indicates that the Xantrex inverter has detected a serial EEPROM write error. The control unit controller board performs a verification check of data written to ROM compared to what is read back.	• Internal ROM error • CPU error
0043	Serial EEPROM Timeout	S	This fault indicates that the Xantrex inverter has detected that when writing data to the serial EEPROM, a confirmation timer of 300mS has expired.	• Internal ROM error • CPU error
0044	Bad NOVRAM Memory	S	This fault indicates that the Xantrex inverter has detected that one of the two non-volatile memory banks on the control unit controller board has failed. The control unit performs a series of tests to confirm the validity of the NOVRAM, and one of the two banks has produced errors.	• Internal NOVRAM error • CPU error

Table 5-1 Fault Codes

Error Code	Fault Source(s)	Fault Type H=Hardware S=Software	Fault Description	Possible Causes
0045	Interrupt 2 Timeout	S	This fault indicates that the Xantrex inverter has detected that an interrupt 2 timeout has occurred. The control unit controller board performs a conversion validation of analog-to-digital data within the A to D converters. If validation of the conversion is not performed within 500mS, an interrupt 2 timeout fault occurs.	• Internal A to D converter error • CPU error
0047	Software Test	S	This fault indicates that the Xantrex inverter has detected that a software test fault has occurred. This is a simulated fault used for debugging purposes.	
0048	Bad Memory	S	This fault indicates that the Xantrex inverter has detected that the SRAM DIMM on the control unit controller board has failed. The control unit performs a series of tests to confirm the validity of the SRAM, and the memory module has produced errors.	• Internal SRAM error • CPU error
0049	Control Voltage Low	S	This fault indicates the Xantrex GT500 E GI and Xantrex GT630 E GI has detected the 230 Vac auxiliary AC voltage has dropped below 165 Vrms for 2 consecutive cycles.	• Fuses -F5, -F6, -F7 blown. • Units with optional ride-through: Xantrex UPS is defective.
0054	Control Voltage High	S	This fault indicates the Xantrex GT500 E GI and Xantrex GT630 E GI has detected the 230 Vac auxiliary AC voltage has exceeded 270 Vrms for 2 consecutive cycles.	• External control voltage source defective. • Units with optional ride-through: Xantrex UPS is defective.
0062	Matrix Temperature	S	This fault indicates that the Xantrex inverter has detected that the temperature of the IGBT matrix aluminium heatsink has exceeded the maximum allowed value of 95 °C.	• External cooling fan inoperable • Air flow on heat sink impeded due to accumulation of debris • Operation above rated ambient temperature for an extended period of time

Table 5-1 Fault Codes

Error Code	Fault Source(s)	Fault Type H=Hardware S=Software	Fault Description	Possible Causes
0072	Local E-STOP	S	Control unit has detected a loss of 15 VDC at terminal J2-1.	Local E-STOP button is depressed.
0073	Remote E-STOP	S	Control unit has detected a loss of 15 VDC at terminal J2-5.	Remote E-STOP button is depressed.
0075	Shutdown Remotely	S	This fault indicates that the Xantrex inverter has detected that the system was commanded via the GUI to transition to the Shutdown State. This fault is not indicative of a failure or malfunction, but primarily used to disable the system remotely.	Remote Shutdown command via the GUI
0082	Matrix Not ON	S	This fault indicates that the Xantrex inverter has detected that the IGBT matrix (FPGA) was not enabled after having sent a command for it to turn on. The control unit sends an acknowledge bit to confirm the command is received. This fault is primarily a watch-dog between software and hardware to ensure control of the IGBT matrix (FPGA).	• Software acknowledge bit not accepted • FPGA inoperable
0083	Matrix Not OFF	S	This fault indicates that the Xantrex inverter has detected that the IGBT matrix (FPGA) was not disabled after having sent a command for it to turn off. The control unit sends an acknowledge bit to confirm the command is received. This fault is primarily a watch-dog between software and hardware to ensure control of the IGBT matrix (FPGA).	• Software acknowledge bit not accepted • FPGA inoperable

Control Unit Disconnect Errors

These errors cause the inverter to disconnect from the grid and shut down. They are reported to the control unit. Should these situations occur, contact Schneider Electric Customer Service.

Fault 0152 IGBT Over-current

Cause: The current has exceeded 2000 Arms.

Fault 0252 Switch Fault

Cause: An IGBT was activated, but no feedback signal was received confirming activation.

Fault 0452 Over-temperature

Cause: The AC current converter's cooling element temperature has exceeded 80 °C. The temperature is displayed in the display.

Fault 0852 Over-voltage DC Bus

Cause: The intermediate circuit voltage has exceeded 950 Vdc.
If the inverter has the 1000 Vdc option, then this fault only applies while the inverter is producing power. Before it starts, the DC voltage can reach 1000 Vdc.

Fault 1052 Earth Fault

Cause: The PV array exceeds the differential current limit of the PV terminals; the difference in current between PV+ and PV- exceeds the predefined limit.

Fault 2052 Under-voltage 24V Converter

Cause: The power semiconductor's control voltage is below 20 V.

Fault 0153 DC Over-current

Cause: The DC bus current has exceeded 1250 A average.

Fault 0853 Too Cold or Internal Voltage not in Range

Causes:

- The internal temperature sensor is reporting temperature below 0°C.
- The internal control circuit supply voltage or clock have malfunctioned.

6 Preventative Maintenance

Chapter 6, “Preventative Maintenance” contains information and procedures for qualified personnel to performing preventative maintenance on the Xantrex inverter.

Maintenance Safety

WARNING: Risk of electric shock, explosion, and arc flash

Before performing maintenance on the Xantrex inverter read all instructions, cautionary markings, and all other appropriate sections of this manual. Exercise extreme caution at all times to prevent accidents.

Failure to follow these instructions will result in death or serious injury.

WARNING: Risk of electric shock, explosion, and arc flash

The Xantrex inverter enclosures contain exposed conductors and parts operating at lethal voltage and at high enough energy to create an arc flash. Electrocution or severe burns may result. The enclosure doors should remain closed with the latches tightened, except during installation, maintenance or testing. These instructions are for use by qualified personnel. To reduce the risk of electric shock or arc flash, do not open any doors or remove any covers unless you are qualified to do so, are properly equipped with appropriate personal protective equipment, and have followed “Lock-out and Tag-out” on page viii to lock-out and tag-out all sources of energy and verified that the inverter is de-energized. Do not open the cabinet doors if moisture is present (rain or heavy dew).

WARNING: Risk of electric shock, explosion, and arc flash

The Xantrex inverter is energized from the PV array, from the AC grid, and from an auxiliary AC source (backed up with a Xantrex UPS for Xantrex GT500 E & Xantrex GT630 E units with low-voltage ride-through capability). All 3 sources (4 including a Xantrex UPS) must be disconnected, locked-out and tagged-out, and all circuits tested to verify that the inverter is fully de-energized, before servicing or maintenance, as described on page viii. Opening the AC and DC disconnect switches on the inverter does not remove all power from the inverter. Wait 20 minutes for the DC bus capacitors, located within the cabinet, to discharge after removing power.

Never work alone when servicing this equipment. A team of two is required until the equipment is properly de-energized, locked-out and tagged-out, and verified de-energized with a meter. See “Maintenance Intervals” on page 6–2. Thoroughly inspect the equipment prior to energizing. Verify that no tools or equipment have inadvertently been left inside the equipment.

Maintenance Intervals

Maintenance intervals must be adhered to in order to ensure that the Xantrex inverter continues to operate in a way that is as safe and reliable as possible. The basis for these maintenance intervals is installation in an environment with an average annual ambient temperature of +20 °C, with cooling air maintained within the temperature limits stated in the Specifications.

Customers should follow the maintenance intervals at a minimum, however the environmental degree of pollution at the installation may mean that maintenance needs to be performed more frequently.

Schneider Electric recommends that the following preventative maintenance procedures be carried out on the Xantrex inverter.

Monthly Intervals or As Required

Visually inspect the intake air ducts and external cooling fans for accumulation of dirt and debris. Accumulation of dirt and debris within the cooling fans will decrease their ability to move air and thus transfer heat away from the IGBT bridge heatsink and inductor, which may cause the Xantrex inverter to enter a Fault state based upon an over-temperature alarm. Remove any dirt or debris obstructing the air intake or exhaust.

Electrical switchgear will need to be maintained as per the manufacturer's recommendation.

Six Month Intervals

Perform the following preventative maintenance tasks on a six-month basis or as required.

Enclosure Seals

Inspect the enclosure door seal. If damaged, replace with equivalent closed cell foam gasket. Call your Schneider Electric distributor for factory replacements or specifications.

Electrical Connections

Inspect the condition of all wiring within and interfacing to the Xantrex inverter. Inspect all compression-type cable terminations and box-type connections within the AC and DC interface, and the main inverter enclosure for damage caused from high temperature. Also check these terminations and connections for signs of corrosion. If any cabling or wiring within and interfacing to the Xantrex inverter are found to be or are suspected to be unacceptable, contact your Schneider Electric distributor for factory replacements or recommendations. Replacement of any damaged wires is necessary.

Verify all mechanical connections are sufficiently tightened. Verify all conduction surfaces are clean and free of corrosion. Mechanical electrical connections may loosen over time primarily due to thermal cycling during normal operation. As electrical connections loosen, impedance increases at the connection, eventually leading to possible fire and component damage. It is critical to check all electrical connections every six months. See termination torque specifications for AC connections in Table A-5 on page A–5. See termination torque specifications for DC connections in Table A-6 on page A–5.

Lightning Protection Devices

Visually inspect the indicators on the lightning protection devices (-F30, -F31, -F32, -F33, -F34). If the visual indicators on one of -F31, -F32, or -F33 are red then the -F35 fuses must be inspected.

Transformer and Inductor Enclosure

Remove the access panel on the transformer and inductors and inspect for any accumulated dirt and debris within the enclosure. Vacuum enclosure whenever dust or dirt is present.

5 year Interval

Control Transformer Fuses

The control transformer fuses are located in the inverter's AC interface enclosure.

Figure 6-1 Control Transformer Fuses

10 year Interval

Facilities will be maintained after ten years. Replace the inverter's interior fan and the power element fan. Clean the control cabinets thoroughly. All fans will only be replaced as a whole.

Power Element Fans

The power element fans are located in the inverter enclosure.

Interior Fans

The inverter's interior fans are located at the top of the enclosure:

- AC interface enclosure: 1 piece
- Main inverter enclosure: 3 pieces
- DC interface enclosure: 1 piece

Graphic shows the DC inverter enclosure fan. Fans in other enclosures are in a similar location.

Figure 6-2 Ventilation Fan Location

A

Specifications

Appendix A provides the environmental and electrical specifications for the Xantrex inverter.

WARNING: Risk of electric shock, explosion, and arc flash. Risk of equipment damage

Unsafe conditions and damage to the inverter may result if the instructions, and electrical, physical, and environmental installation specifications in this manual are not obeyed.

System Specifications

The Xantrex inverter has been designed for photovoltaic power systems, which operate within the following specifications.

Electrical Specifications

Table A-1 Electrical Specifications

Specification	Xantrex GT500 E	Xantrex GT630 E
Nominal AC Output Voltage (see Table A-4)	315 V (requires custom MV transformer)	375 V (requires custom MV transformer)
Maximum AC Output Current		
with no options with Optional VAR Control	920 A 1040 A	965 A 1040 A
Nominal AC Output Frequency (see Table A-4)	50 Hz (60 Hz auto-detect)	
AC Output Voltage	315 V ± 5%	375 V ± 5%
Max. Reactive Power (only with Optional VAR Control)	200 kVar	250 kVar
Phase Angle (only with Optional VAR Control)	± 22° degrees	± 22° degrees
Line Power Factor	> 0.99 (above 20% rated power)	
with Optional VAR Control	0.93 leading to 0.93 lagging	
AC Current Distortion	< 3% THD at rated power	< 3% THD at rated power
Rated Current AC Output		
with no options with Optional VAR Control	920 A 1040 A	965 A 1040 A
Output Power	500.0 kW	630.0 kW
Suggested PV Array Power	560 kWp	705 kWp
Maximum Open Circuit PV Voltage		
with no options with Optional 1000 Vdc Input	930 V	930 V 1000 V
Maximum DC Input Current	1120 A	1120 A
DC Input		
with no options with Optional VAR Control with Optional 1000 Vdc Input	450 to 930 V 495 to 930 V	575 to 930 V 575 to 930 V 575 to 1000 V
MPP Range		
with no options with Optional VAR Control	450 to 880 V[a] 495 to 880 V[a]	575 to 880 V[a] 575 to 880 V[a]
Efficiency without Transformer	97.9 % (European weighted efficiency at 495 Vdc and 315 Vac)	98.2 % (European weighted efficiency at 575 Vdc and 375 Vac)
External Auxiliary Supply Voltage	230/315/375/400 VA	
External Auxiliary Supply Power Required	2500 VA	2500 VA
Inverter's Capacitance to Earth	approx. 15 µF	approx. 15 µF

a. reduced current above 820 V

WARNING: Risk of electric shock, explosion, and arc flash. Risk of equipment damage

Unsafe conditions and damage to the inverter may result if the inverter is energized with condensation present inside the unit. Storage, transportation, and operational conditions must ensure that internal condensation is not created, or that the inverter is dry before energizing. Obey the environmental specifications and classifications in Table A-2 and Table A-3.

Physical and Environmental Specifications

Table A-2 Physical and Environmental Specifications

Specification	Value
Dimensions	2112 mm H x 2406 mm W x 605 mm D (83 in. H x 94¾ in. W x 24 in. D)
Weight	1770 kg (3902 lbs)
Allowable Ambient Temperature and Humidity Ranges	Operating: EN60721 class 3K3: -10 °C to 45 °C Maximum (14 °F to 113 °F) Max 95% relative humidity, non-condensing
	Transport: EN60721 class 2K2: -25 °C to 55 °C Maximum (-13 °F to 131 °F) Max 95% relative humidity, non-condensing
	Storage: EN60721 class 1K2: -25 °C to 55 °C Maximum (-13 °F to 131 °F) Max 95% relative humidity, non-condensing
Maximum Elevation	1500 m
Storage Air Pressure	700 to 1060 mbar
Ingress Protection Class	IP20
Matrix Heatsink Cooling Fans	2700 m^3/h temperature threshold 68 °C
Cooling Air Power Cabinet (+H1)	4200m^3/h, fan starting temperature: 30 °C for roof fans 65°C for heat sink fans
Cooling Air AC/DC Cabinet (+H2, +H0)	700m^3/h, fan starting temperature: 30°C
Total Cooling Air	5600m^3/h
Clearance (ventilation and serviceability)	Top: 100 mm Front: 600 mm (door clearance) plus local safety standards

Table A-3 shows the allowable environmental classifications for the inverter, based on the EN60721 series of standards.

Table A-3 Environmental Classifications (EN60721 series of standards)

	Storage (1 prefix) EN60721-3-1	Transport (2 prefix) EN60721-3-2	Operation (3 prefix) EN60721-3-3
Classification of Climatic Conditions	1K2	2K2	3K3
Classification of Special Climatic Conditions	1Z1	2Z1	3Z1
Classification of Biological Conditions	1B1	2B1	3B1
Classification of Chemically Active Substances	1C1	2C1	3C1
Classification of Mechanically Active Substances	1S1	2S1	3S1
Classification of Mechanical Conditions	1M1	2M1	3M1

Regulatory Specifications

Regulatory specifications for the Xantrex inverter are as follows:

- CE marked for the Low Voltage Directive per EN50178
- CE marked for the EMC Directive per EN61000-6-4 (emissions) and EN61000-6-2 (immunity)
- Complies with RD1663/2000 and 661/2007 (Spain)
- Complies with Decree from 23 April 2008; “Arêté du 23 Avril 2008” (France)
- Low voltage ride-through version complies with BDEW medium voltage grid connection requirement; "Technische Richtlinie - Erzeugungsanlagen am Mittelspannungsnetz, BDEW, June 2008" (Germany)
- Bureau Veritas certificate for DK5940 (Italy)

Over Voltage, Under Voltage and Frequency Ranges

Table A-4 provides the over-voltage, under-voltage, over-frequency, and under-frequency detection limits for the Xantrex inverter. These detection limits have been tested and are in compliance with requirements given under Regulatory Specifications above.

Table A-4 Over/Under-Voltage and Over/Under-Frequency Ranges

AC Voltage Condition (% of Nominal)	Xantrex GT500 E	Xantrex GT630 E
Low Range		
85% ≤ Vac ≤ 105%	267.75 ≤ Vac ≤ 330.75	318.75 ≤ Vac ≤ 393.75
5% ≤ Vac ≤ 105%[a]	15.75 ≤ Vac ≤ 330.75	18.75 ≤ Vac ≤ 393.75
Low Default	Vac = 283.5	Vac = 337.5
90% = Vac		
High Range	305.55 ≤ Vac < 362.25	363.75 ≤ Vac ≤ 431.25
97% ≤ Vac ≤ 115%		
High Default	Vac = 346.5	Vac = 412.5
110% = Vac		
50 Hz Low Range	47.0 ≤ f ≤ 50.5	47.0 ≤ f ≤ 50.5
-3.0 Hz ≤ f ≤ +0.5 Hz		
50 Hz Low Default	f = 49.0	f = 49.0
50 Hz High Range	49.5 ≤ f ≤ 53.0	49.5 ≤ f ≤ 53.0
-0.5 Hz ≤ f ≤ +3.0 Hz		
50 Hz High Default	f = 51.0	f = 51.0
60 Hz Low Range	55.0 ≤ f ≤ 60.5	55.0 ≤ f ≤ 60.5
-5.0 Hz ≤ f ≤ +0.5 Hz		
60 Hz Low Default	f = 59.5	f = 59.5
60 Hz High Range	59.5 ≤ f ≤ 65.0	59.5 ≤ f ≤ 65.0
-0.5 Hz ≤ f ≤ +5.0 Hz		
60 Hz High Default	f = 60.5	f = 60.5

a.values are for all units with the optional low voltage ride-through capability installed

Bolt Sizes and Torque Requirements

Table A-5 provides acceptable bolt sizes and torque values for AC terminal connections.

Table A-5 AC Terminal Bolt Size, and Torque Values

AC Terminal Connections	Max. # of Conductors per Terminal	Bolt (Hardware) Size	Torque Requirements
PE (Enclosure Ground)	2	1/M12	75 Nm (55 lb ft)
L1, L2, L3	6	3/M12	75 Nm (55 lb ft)
-X2:L1, -X2:L2 to AC aux input transformer	1	cable cross section 0.5 - 10 mm^2 use appropriate ferrules	0.6 – 0.8 Nm (5.3 – 7.1 lb ft)
-X2:23 and -X2:25 to UPS input, -X2:24 and -X2:26 to UPS output	1	cable cross section 0.5 - 10 mm^2 use appropriate ferrules	0.5 – 0.6 Nm (4.4 lb ft– 5.3 lb ft)
X2:6 and X2:7 (external interlock)	1	cable cross section: 0.14 - 2.5 mm^2 use appropriate ferrules	
X2:20 and X2:22 (external voltage)	1	cable cross section 0.5 - 10 mm^2 use appropriate ferrules	

Table A-6 provides acceptable bolt sizes and torque values to be connected to the Xantrex inverter's DC terminal connections.

Table A-6 DC Terminal Bolt Size, and Torque Values

DC Terminal Connections	Max. # of Conductors per Terminal	Bolt (Hardware) Size	Torque Requirements
PV+, PV-	8	8/M12	75 Nm (55 lb ft)

Uninterrupted Power Supply – UPS

If you have a Xantrex GT500 E or Xantrex GT630 E with optional ride-through capability you need to install a UPS for operation. You can order an appropriate UPS from Schneider Electric (part number: 820-0031-01-01) if you are using 230 Vac auxiliary supply voltage in your installation, or you can use any UPS which meets the requirements in Table A-7 and matches the auxiliary supply voltage for your installation.

Table A-7 Minimum UPS Specifications

Power	500 VA
AC Input	must match auxiliary supply voltage provided by the installer (230, 315, or 400 Vac)
AC Outputs	230 V
Use UPS in bypass operation:	
Cross-over Time	< 10 msec
Support Time	> 5 sec

Dimensions

Dimensions in mm

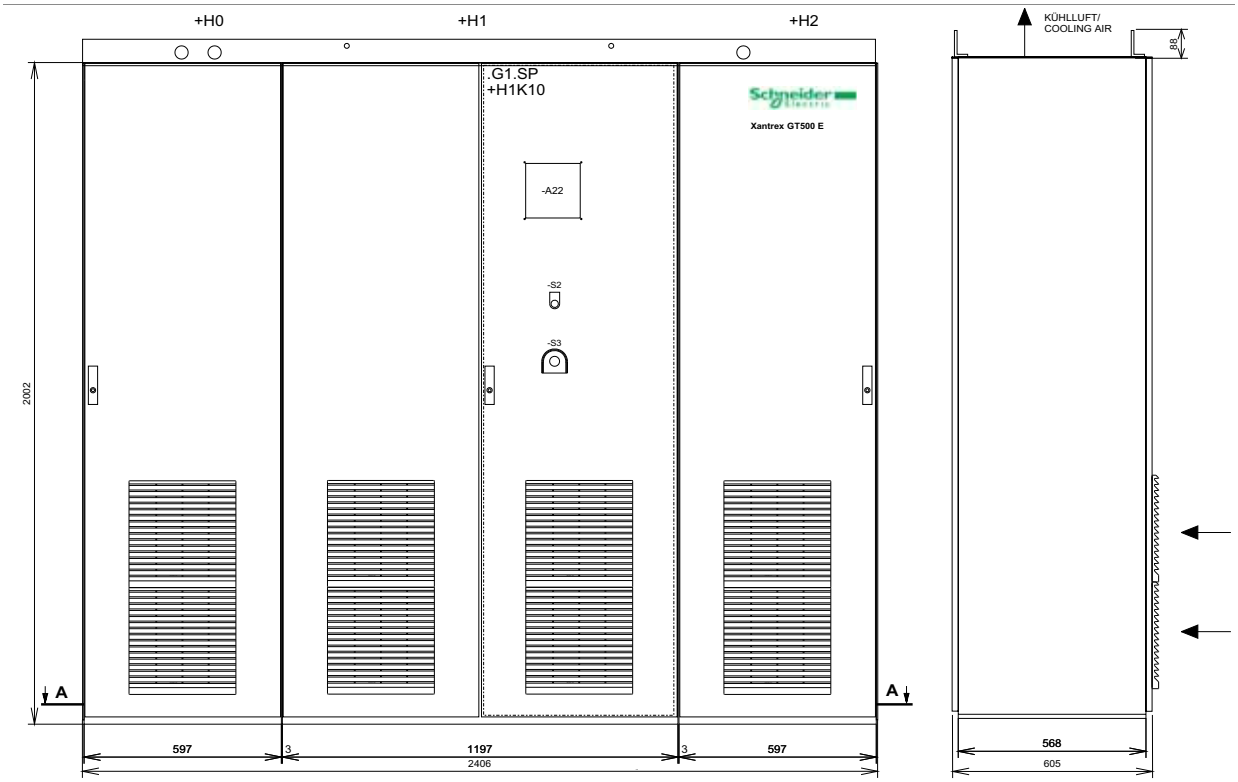

Figure A-1 Xantrex Inverter Dimensions

Schneider Electric

www.schneider-electric.com

	☎	🖷	✉
North America	1 408 987 6255	1 925 245 1022	re.techsupport@schneider-electric.com
France	0 825 012 999		fr-re-techsupport@fr.schneider-electric.com
Deutschland	+49 (0) 180 575 6575	+49 (0) 2102 404 7101	solarservice@de.schneider-electric.com
España	+34 93 498 7466	+34 93 305 5026	re.techsupport@es.schneider-electric.com
L'Italia	+39 035 4151111	+39 035415 3200	IT-pronto-contatto@it.schneider-electric.com

For other country details please contact your local Schneider Electric Sales Representative or visit our website at:
http://www.schneider-electric.com/sites/corporate/en/support/operations/local-operations/local-operations.page

975-0581-01-01

Printed in Germany